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NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE, --ETC(U)
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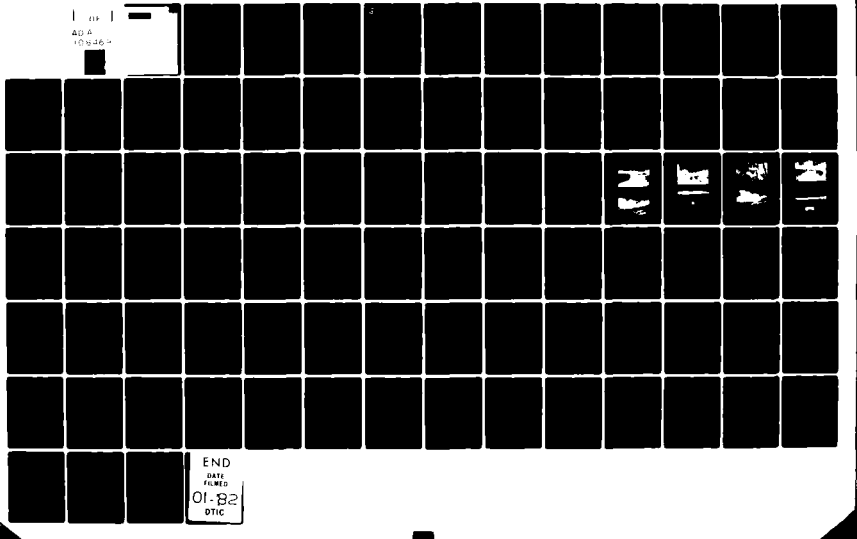

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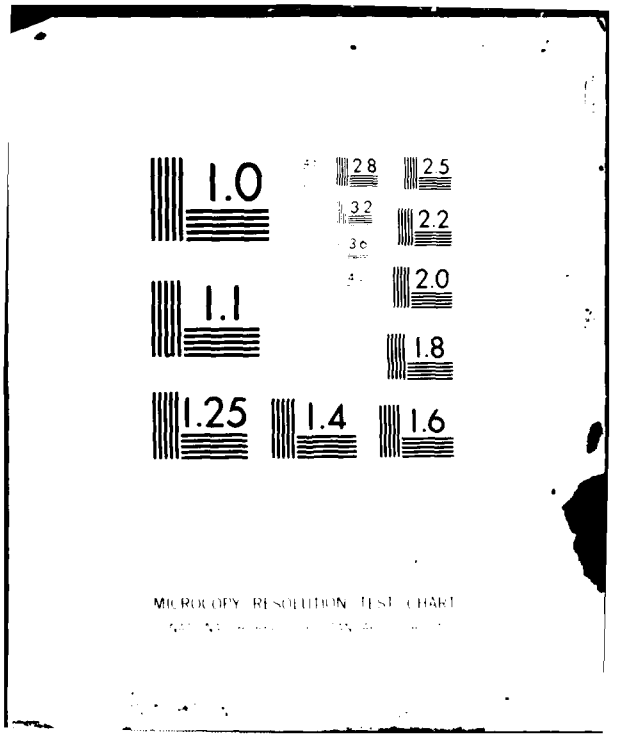
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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A108 469
	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) National Program of Inspection of Non-Federal Dams, Tennessee. Jesse Byrd Dam (Inventory Number TN 07518) near Providence, TN, Haywood County, TN. South Fork Forked Deer River Basin	5. TYPE OF REPORT & PERIOD COVERED Phase 1 Investigation Report
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)	8. CONTRACT OR GRANT NUMBER(s) DACW-62-81-C-0056
9. PERFORMING ORGANIZATION NAME AND ADDRESS Winsett-Simonds, Consterdine & Associates, Inc. P.O. Box 40045 Memphis, Tennessee 38104	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Nashville P.O. Box 1070 Nashville, TN. 37202	12. REPORT DATE September, 1981
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14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) Tennessee Department of Conservation Division of Water Resources 4721 Trousdale Drive Nashville TN. 37220	15. SECURITY CLASS. (of this report) Unclassified
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18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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Dam Safety
National Dam Safety Program
Jesse Byrd Dam. TN.
Providence TN
Haywood County, TN
Embankments
Visual Inspection
Structural Analysis

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Jesse Byrd Dam is located in Haywood County, Tennessee eleven miles northeast of Brownsville Tennessee and is an earth fill embankment 28.7 feet high and 518 feet long. The crest width is ten feet. Facilities for dishcarge of the reservoir include a service spillway located near the center of the dam that has an 18 inch asphalt coated corrugated metal riser with a 12 inch asphalt coated corrugated metal pipe barrel and a two foot section of 36 inch corrugated metal pipe attached to the top of the riser to serve as an antivortex baffle and debris guard. A slide gate is attached to the bottom of the riser

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to provide a means of draw down the lake. The emergency spillway is located in the left abutment in a natural swale that has had some shaping. The spillway has a bottom width of 60 feet and side slopes of IV on 23H and 1V on 13H. Its depth of flow below the low point of the dam is 3.0 feet and its maximum capacity at this depth was calculated to be 337 cfs. The embankment slopes are 1V on 3H. The upstream slope has no wave protection. The downstream slope has undesirable vegetation. Jesse Byrd Dam is in the small size category and has a downstream hazard potential classification of high by the USCE and "I" by the State of Tennessee. Flood storage (71 acre-feet) and spillways are adequate to pass the 1/2 Probable Maximum Flood (PMF), which Office of the Chief of Engineers (O.C.E.) Guidelines specify to be the design flood for a dam in the small size and high hazard categories. At this time, the dam is considered deficient. It is recommended that a qualified engineer te engaged to: investigate the back slope of the dam for deficiencies after it has been cleared by the owner; investigate the cause of seepage at the east abutment and recommend remedial measures to recoat the pipe and prevent further rusting; develop an emergency action plan to alert the downstream residents in the event a major prob em develops with the dam; develop a program for future reexamination and maintenance on an annual basis.

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

21 SEP 1981

IN REPLY REFER TO

ORNED-G

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Furnished herewith is the Phase I Investigation Report on Jesse Byrd Dam near Providence, Tennessee. The report was prepared under the authority and provisions of PL 92-367, the National Dam Inspection Act, dated 8 August 1972.

The report presents details of the field inspection, background information, technical analyses, findings, and recommendations for improving the condition of the dam.

Based upon the inspection and subsequent evaluation, Jesse Byrd Dam is classified as deficient due to excessive growth of brush on the embankment and minor seepage through the abutment.

We do not consider this an emergency situation at this time, but the recommendations concerning removal of the brush from the embankment, investigating the cause of the seepage, and others contained in this report should be undertaken in the near future.

Public release of the report and initiation of public statements fall within your prerogative. However, under provisions of the Freedom of Information Act, the Corps of Engineers is required to respond fully to inquiries on information contained in the report and to make it accessible for review on request.

Your assistance in keeping me informed of any further developments will be appreciated.

Sincerely,

Kenneth W. Ashley, LTC
FOR LEE W. TUCKER
Colonel, Corps of Engineers
Commander

1 Incl
As stated

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220

PHASE I INSPECTION

JESSE BYRD DAM

HAYWOOD COUNTY, TENNESSEE

Prepared By:

WINSETT-SIMMONDS, CONSTERDINE & ASSOCIATES, INC.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE

Name of Dam	Jesse Byrd Dam
County	Haywood
Stream	Tributary South Fork Forked Deer River
Date of Inspection	May 14, 1981

This investigation and evaluation report was prepared for the Tennessee Department of Conservation, Division of Water Resources by Winsett-Simmonds, Consterdine & Associates, Inc., P.O. Box 40045, Memphis, TN 38104.

Prepared By:

Wm. E. Bush, P.E., Director
Civil & Water Resources Engineering

ABSTRACT

Jesse Byrd Dam is located in Haywood County, Tennessee eleven miles northeast of Brownsville, Tennessee and is an earth fill embankment 28.7 feet high and 518 feet long. The crest width is ten feet. Facilities for discharge of the reservoir include a service spillway located near the center of the dam that has an 18 inch asphalt coated corrugated metal riser with a 12 inch asphalt coated corrugated metal pipe barrel and a two foot section of 36 inch corrugated metal pipe attached to the top of the riser to serve as an antivortex baffle and debris guard. A slide gate is attached to the bottom of the riser to provide a means to draw down the lake. The emergency spillway is located in the left abutment in a natural swale that has had some shaping. The spillway has a bottom width of 60 feet and side slopes of 1V on 23H and 1V on 13H. Its depth of flow below the low point of the dam is 3.0 feet and its maximum capacity at this depth was calculated to be 337 cfs.

The embankment slopes are 1V on 3H. The upstream slope has no wave protection. The downstream slope has undesirable vegetation.

Jesse Byrd Dam is in the small size category and has a downstream hazard potential classification of high by the USCE and "I" by the State of Tennessee.

On the basis of hydraulic analysis, Jesse Byrd Dam flood storage (71 acre-feet) and spillways are adequate to pass the ½ Probable Maximum Flood

(PMF), which Office of the Chief Engineers (O.C.E.) Guidelines specify to be the design flood for a dam in the small size and high hazard categories.

At this time, the dam is considered deficient. It is recommended that a qualified engineer be engaged to: investigate the backslope of the dam for deficiencies after it has been cleared by the owner; investigate the cause of seepage at the east abutment and recommend remedial measures if necessary; investigate the condition of the service spillway and recommend measures to recoat the pipe and prevent further rusting; develop an emergency action plan to alert the downstream residents in the event a major problem develops with the dam; develop a program for future reexamination and maintenance on an annual basis.

TABLE OF CONTENTS

OVERVIEW PHOTO

PHASE I INSPECTION

JESSE BYRD DAM

HAYWOOD COUNTY, TENNESSEE

SECTION 1 - GENERAL

1.1 Authority - The Phase I inspection of this dam was carried out under the authority of the Tennessee Code Annotated 70-2501 to 70-2530, "The Safe Dams Act of 1973", in cooperation with the Corps of Engineers under the authority of PL 92-367, "The National Dam Inspection Act".

1.2 Purpose and Scope - This report is prepared under guidance contained in Department of the Army, Office of the Chief of Engineers, Recommended Guidelines for Safety Inspection of Dams, for a Phase I investigation. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspections. Detailed investigation and analysis involving topographic mapping, subsurface investigation, testing and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. Additional data or data furnished containing incorrect information could alter the findings of this report.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions will be detected.

1.3 Past Inspections - An inventory reconnaissance trip was made to Jesse Byrd Dam by the Division of Water Resources, State of Tennessee, on May 31, 1980. (See Appendix F).

1.4 Miscellaneous Details - On the day of the Phase I Inspection, the weather was cloudy with temperatures in the 70's and the wind was gusty. The level of the lake was approximately at the crest of the riser.

1.5 Inspection Team Members - Field inspection was performed by the following Winsett-Simmonds, Consterdine & Associates, Inc. personnel:

William E. Bush, P.E.
Civil Engineer

Dr. Fred H. Kellogg, P.E.
Geotechnical Engineer

The team was accompanied by Mr. Edmond O'Neill of the Tennessee Division of Water Resources.

SECTION 2 - PROJECT DESCRIPTION

2.1 Location - Jesse Byrd Dam is located in Haywood County, Tennessee, 11 miles northeast of Brownsville, Tennessee. It can be located on USGS Map, "Bells, Tennessee", at longitude 89°04'29" and latitude 35°38'59".

2.2 Description

2.2.1 Embankment - The Jesse Byrd Dam is an earth embankment dam with a northeast-southwest orientation, a maximum height of 28.7 feet, and a length of 518 feet. The crest width is ten feet. The upstream slope averages 1V to 3.0 H from the water line to the top of the dam. The downstream slope averages 1V to 3.0H. Embankment sketches are provided in Exhibit B.

2.2.2 Service Spillway/Low Level Outlet - The service spillway is a 18 inch, asphalt coated, corrugated metal pipe with a 12 inch asphalt coated, corrugated metal pipe barrel, and a two foot section of 36 inch CM pipe attached to the top of the riser to serve as an antivortex baffle and debris guard. A slide gate attached to the bottom of the riser provides a means to draw down the lake.

2.2.3 Emergency Spillway - The emergency spillway is located in the left abutment in a natural swale that has had some shaping. The spillway has a bottom width of 60 feet and side slopes of 1V to 23H and 1V to 13H. Its depth below the low point of the

dam is 3.0 feet and its maximum capacity at depth of 3.0 feet was calculated to be 337 cfs.

2.2.4 Reservoir and Drainage Area - The reservoir has a surface area of 15.5 acres at normal pool elevation with a fetch of 1150 feet. The normal impounding capacity of the reservoir is estimated to be 132 acre-feet with an additional 71 acre-feet of flood storage. The drainage area is 111 acres and the predominant soil association is Grenada-Loring-Memphis.

2.2.5 Miscellaneous - The dam was built in 1975. The dam was designed by the USDA Soil Conservation Service and built by the owner. No major repair work has been reported.

SECTION 3 - INSPECTION FINDINGS

3.1 Specific Findings

3.1.1 Embankment

Geology - The Jesse Byrd Dam is located in an area of clayey and silty sand (Groups SC and SM in the Unified Classification System) belonging to the Claiborne formation. The sand contains many interbeds of silty clay (Group CL), and silt (Group ML) that are continuous over large areas. Sands and silts are quite cohesive, low plasticity silts of Group ML.

Crest - The longitudinal alignment of Byrd Dam is straight with a northeast-southwest orientation. The crest is traversed with an unpaved farm road approximately eight feet in width. The elevation of the crest appears to fall from the right abutment to the left abutment. No longitudinal or transverse surface cracks were noted. The general condition of the surface was good but the sod could be improved. The average top width of the dam is ten feet. The freeboard at the time of the inspection was about six feet.

Upstream Slope - The upstream slope is free from undesirable growth and debris. Sloughing is continuous all along the slope at the waterline. The slope above the vertical cut to the crest is one vertical on three horizontal. There are many crayfish holes just above the water level on the slope. No jugs were observed on this slope. No surface cracks were noted

on the upstream slope.

Downstream Slope - Head high weeds and small saplings made it difficult to observe if holes and other deformities were present on the downstream slope. In a few open areas, deep rills, apparently old, were observed. No surface cracks were observed on the face of the slope nor evidence of heaving at the embankment toe. A recent rain had caused several damp spots at the toe of the slope. No toe drain system was observed.

Abutments - There is some shallow erosion of the contact of the east abutment of Byrd Dam. There is also erosion at the west abutment ridge in a clay sand. Several springs were observed in the east abutment. These springs seem to occur at about the same elevation as the pool level of the dam. No springs or indications of seepage in areas a short distance downstream from the embankment abutments tie-in were observed.

3.1.2 Seismic Zone - The Jesse Byrd Dam is in Seismic Zone 3. No record of any stability analysis could be found.

3.1.3 Seepage - The only evidence of possible seepage was observed in the east abutment.

3.1.4 Spillways - The service spillway for the Jesse Byrd Dam has a 12 inch corrugated metal pipe barrel that extends through

the dam and an 18 inch riser with a 36 inch corrugated metal pipe as the antivortex baffle at the top. This installation also has a gate valve on the riser to drain the lake. Soil Conservation Service plans for the Jesse Byrd Dam show the 12 inch diameter barrel, 18 inch riser, and 36 inch trash rack to be asphalt coated. This coating has sloughed off all the visible portions of both riser and barrel. The riser is beginning to rust and the outlet end of the barrel is completely rusted. Rain had occurred within two hours of the inspection and the runoff water through the pipe was muddy. There was no evidence of leakage of the contact with the soil and the outlet pipe.

The emergency spillway is located in the left abutment. The general condition of the approach slope and control section is good. The entrance channel has a good sod and is estimated to have a one percent slope up to the control section. The control section has a good sod and appears to be 15 to 20 feet in length. The exit channel is a natural slope and is experiencing a good deal of gulleying. Debris and hay bales have been thrown into this gullied area to stop the erosion. The emergency spillway side slopes appear to have taken advantage of a natural swale rather than having been cut with a flat bottom.

3.1.5 Downstream Inspection and Hazard Classification - The Jesse Byrd Dam has a hazard potential classification of high. There

is a state highway and two house sites 2000 feet below the dam that are in the probable flood path in the event of failure of the Jesse Byrd Dam.

3.1.6 Hydrology and Hydraulics - According to O.C.E. Guidelines, dams with a high hazard, small size classification should have storage and spillway capacity to pass the ½ PMF without overtopping the dam. The Probable Maximum Precipitation (PMP) of 29.3 inches in six hours yields a ½ PMF of 12.16 inches. Time of concentration of the drainage area of Jesse Byrd Dam was estimated to be 0.52 hours and flood storage from the normal pool to the low point of the top of the dam is estimated to be 71 acre-feet. Routing of the ½ PMF (Antecedent Moisture Condition II) produced a peak outflow of 236 cfs, Jesse Byrd Dam contained this storm with a freeboard of 0.4 feet.

The 100-year, 6-hour flood was routed through the structure. Jesse Byrd Dam contained this storm with a freeboard 1.8 feet.

The 1-10 day, 100-year storm was routed through the structure and produced flow in the emergency spillway.

3.2 Conclusions and Recommendations

3.2.1 Conclusions

a. Hydraulic analysis indicates that the Jesse Byrd Dam

(spillway and storage capacity) is adequate to pass the design flood with a 0.4 foot freeboard.

b. On the basis of engineering judgment and visual observation, both the upstream and downstream slopes appear to be stable.

c. High vegetation, found on the downstream slope, made observation of the slope difficult and possibly hid other deformities.

d. The deterioration of the asphalt coating on the service spillway has progressed to the point that the pipe is now rusting. Continuation of this problem could lead to failure of the pipe.

e. Several springs were observed at the east abutment. These springs tend to occur about the same elevation as the pool level of the dam and could possibly be fed by the impoundment.

f. Jesse Byrd Dam is in Seismic Zone 3. Stability analysis of the embankment with earthquake loading is not within the scope of this report.

g. Jesse Byrd Dam is considered "deficient". That is, a dam with deficiencies which need attention but which would not likely effect the safety of the dam unless unchecked for a long period of time.

3.2.2 Recommendations - No serious deficiencies were noted during this inspection; but, a few items need attention. Namely,

the tall grass and saplings on the backslope should be removed and the backslope inspected in detail after their removal. The gulleying of the backslope of the emergency spillway should be filled in and seeded to effectively eliminate the gulleying of the exit slope. The springs in the east abutment should be monitored and if they should continue to flow to the driest part of summer, remedial measures should be taken to correct this situation. The service spillway structure should be maintained to keep the corrugated metal pipe from rusting through and setting up piping conditions under the dam.

The owner should:

a. Clear the backslopes of all objectionable vegetation.
b. Monitor the seepage in the east abutment throughout the summer to determine any changes in the quantity or color until an engineer is engaged.
c. Open up ditch below outlet pipe so that water does not stand in the pipe.

A qualified engineer should be engaged to:

a. Inspect the downstream slope for any indications of failure.
b. Investigate the cause of seepage in the east abutment and suggest remedial measures if necessary.
c. Investigate the service spillway structure and recommend remedial measures.

d. Develop an emergency action plan to alert downstream residents in the event a major problem rises with the dam.

e. Develop an inspection and maintenance program for the dam to be carried out at least annually.

f. Evaluate the stability of the dam with earthquake loadings.

SECTION 4 REVIEW BOARD FINDINGS

The Interagency Review Board for the National Program of Inspection of Non-Federal Dams met in Nashville on 16 July 1981 to examine the technical data contained in the Phase I investigation report on Jesse Byrd Dam. The Review Board considered the information and recommended that (1) in recommendation c, the option of replacing the corrugated pipe should be added, and (2) the water level in the plunge pool should be kept below the end of the outlet pipe. They agreed with other report conclusions and recommendations. A copy of the letter report presented by the Review Board is included in Appendix I.

APPENDIX A

DATA SUMMARY SHEET

APPENDIX A
DATA SUMMARY SHEET

A.1 DAM - Jesse Byrd

A.1.1 Type - Earth Fill

A.1.2 Dimensions and Elevations - Elevations were determined from existing TBM set on root of tree on left side of the emergency spillway. TBM elev. 388.0 MSL.

a.	Crest length	518 feet
b.	Crest width	10 feet
c.	Height (maximum)	28.7 feet
d.	Crest elevation (low point)	389.0 feet
e.	Service spillway elevation	385.2 feet
f.	Emergency spillway elev. right	N.A.
g.	Emergency spillway elev. left	386.0 feet
h.	Embankment slope, U/S (from water surface to crest	1V on 3.0H
i.	Embankment slope, D/S (from lower slope to crest)	1V on 3.0H
j.	Size classification	Small

A.1.3 Zones, Cutoffs, Grout Curtains — Keyway

A.1.4 Instrumentation — None

A.2 RESERVOIR AND DRAINAGE AREA

A.2.1 Reservoir - (Normal pool elevation 385.2, 3.8 feet below the effective crest).

a.	Surface area	15.5 acres
b.	Length of pool	1150 feet
c.	Capacity (Normal pool)	132 acre-feet (est.)
d.	Maximum surface area	22 acres
e.	Flood Storage	71 acre-feet

A.2.2 Drainage Area

a.	Size	111 acres (0.17 sq. miles)
b.	Characteristics: Average watershed slope, 2.3%; soil cover, Grenada-Loring-Memphis Association; cover, pasture 55%, cultivated 45%.	
c.	Runoff PMF (AMC II)	24.32 inches
d.	Runoff ½ PMF (AMC II)	12.16 inches
e.	Runoff P_{100} (AMC III)	3.64 inches

A.3 OUTLET STRUCTURES

A.3.1 Drawdown Facilities - 12 inch gate valve on upstream side of service spillway riser.

A.3.2 Service Spillway - 18 inch asphalt coated, corrugated metal riser with a 12 inch CM barrel and 36 inch CM pipe trash rack and antivortex baffle.

a.	Crest elevation	385.2 feet MSL
b.	Length (barrel)	140 feet
c.	Maximum discharge capacity	6.2 cfs

A.3.3 Emergency Spillway (left abutment)

a.	Crest elevation	386.0 feet
b.	Side slope (left)	1V on 23H
c.	Side slope (right)	1V on 13H
d.	Depth	3.0 feet
e.	Bottom width	60 feet
f.	Maximum capacity	337 cfs
g.	Control section	20 feet

A.3.4 Emergency Spillway (right abutment) — None

A.4 HISTORICAL DATA

A.4.1	Construction Date	1975
A.4.2	Designer	USDA Soil Conservation Service
A.4.3	Builder	Jesse Byrd
A.4.4	Owner	Jesse Byrd
A.4.5	Previous Inspection	May 31, 1980
A.4.6	Seismic Zone	3

A.5 DOWNSTREAM HAZARD DATA

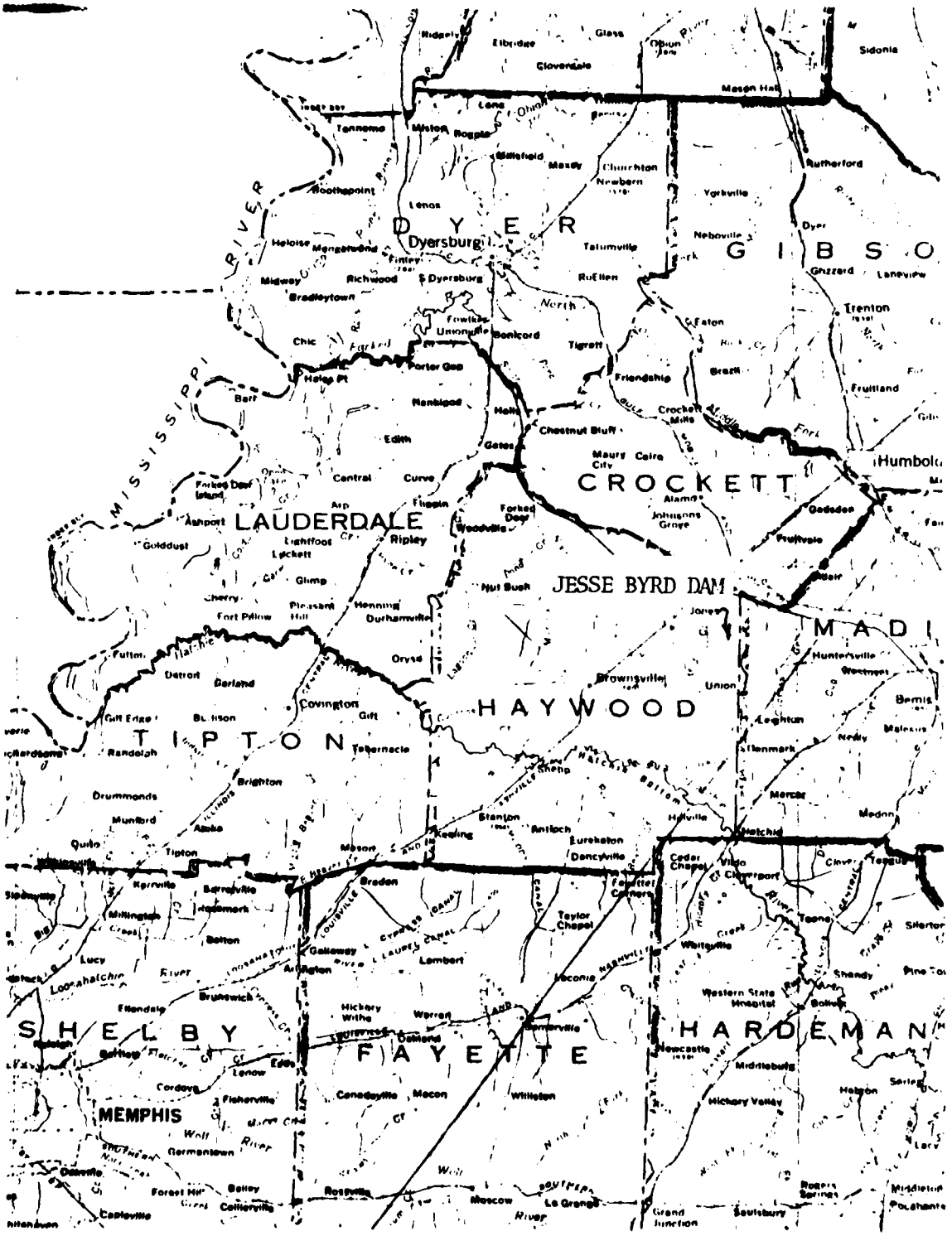
A.5.1 Downstream Hazard Potential Classification

a.	Corps of Engineers	High
b.	State of Tennessee	1

A.5.2	Persons in Probable Flood Path	8 (est.)
A.5.3	Downstream Property	Two houses & state highway
A.5.4	Warning Systems	None

APPENDIX B

SKETCHES AND LOCATION MAPS



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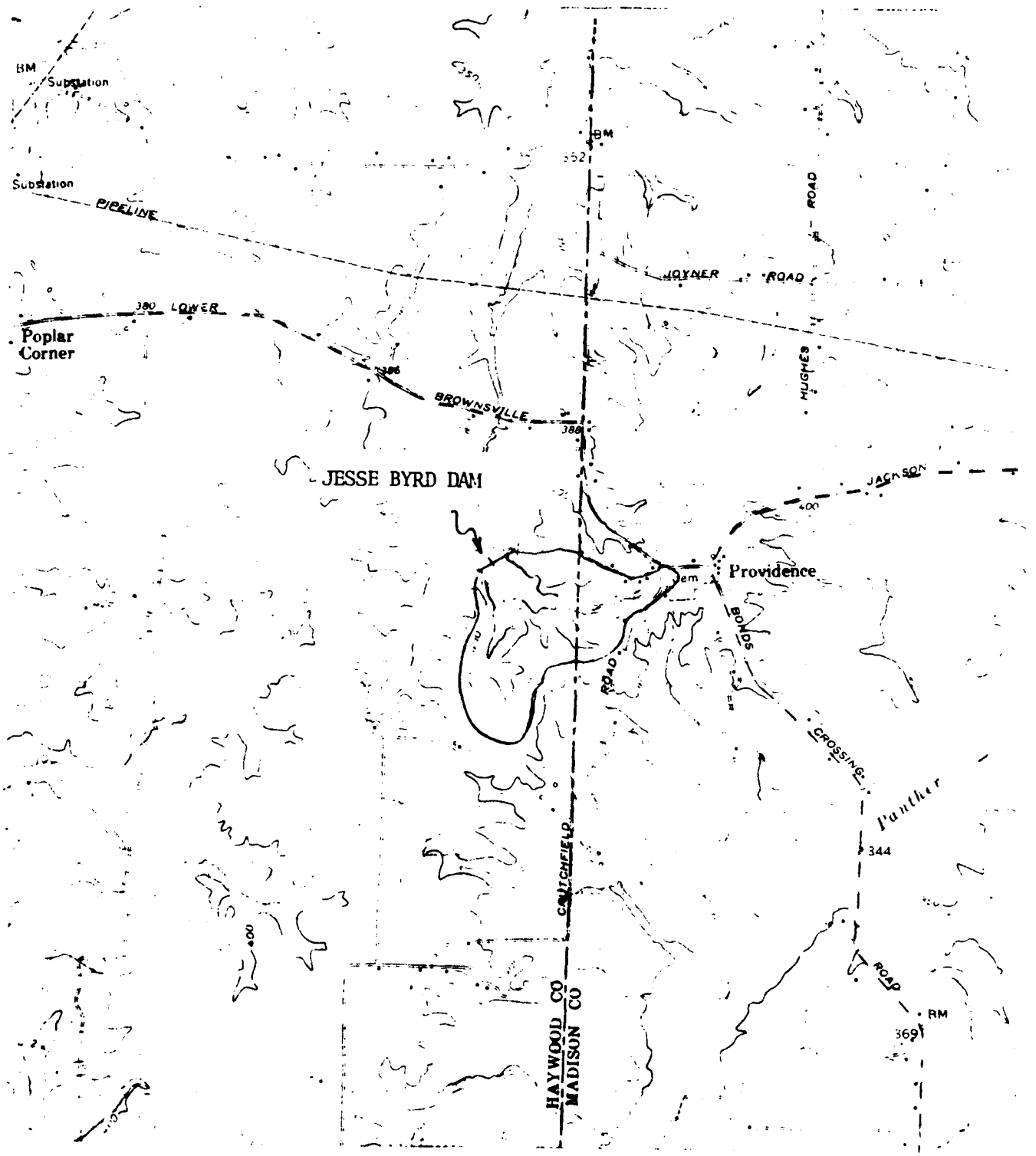

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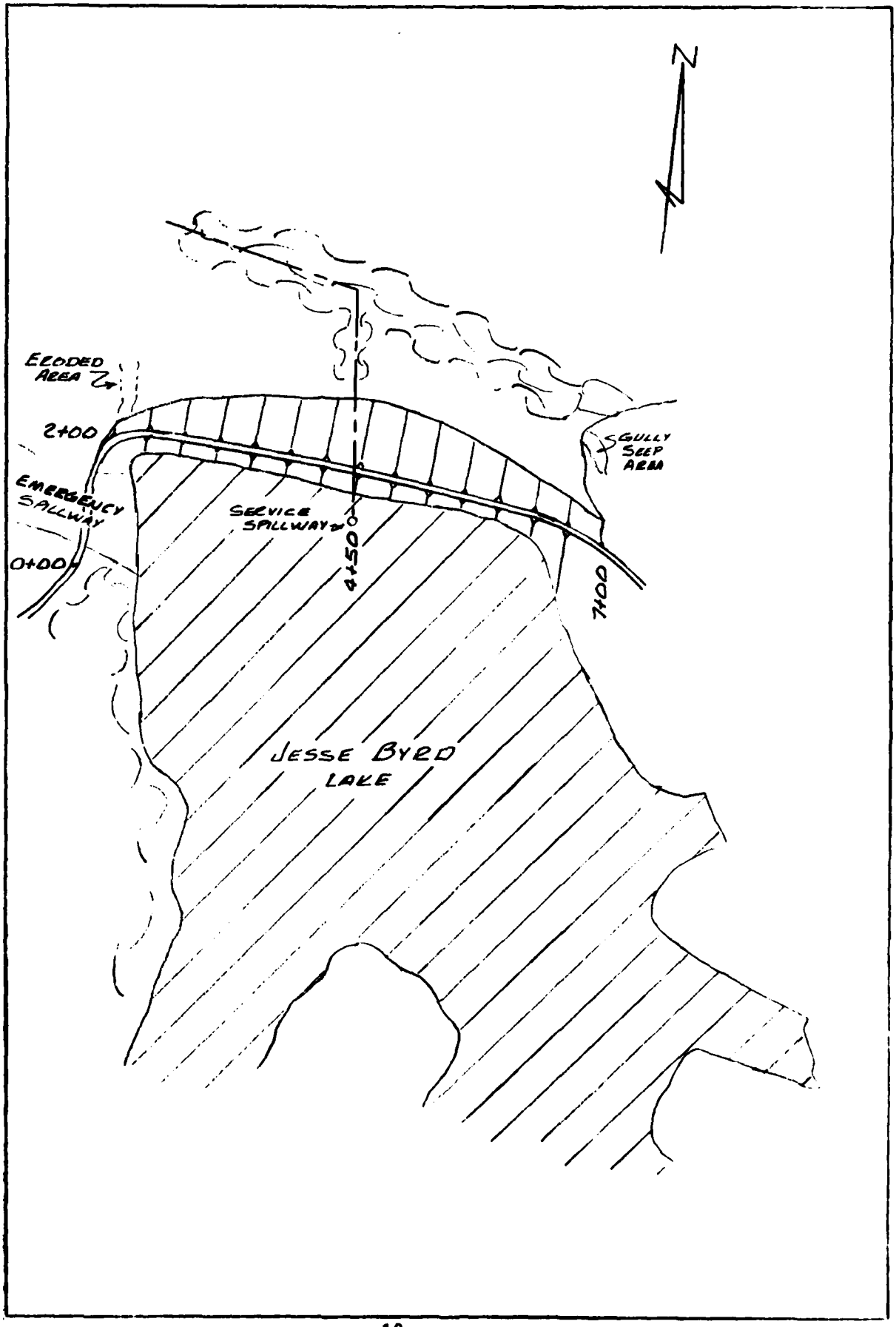
JESSE BYRD DAM
SITE MAP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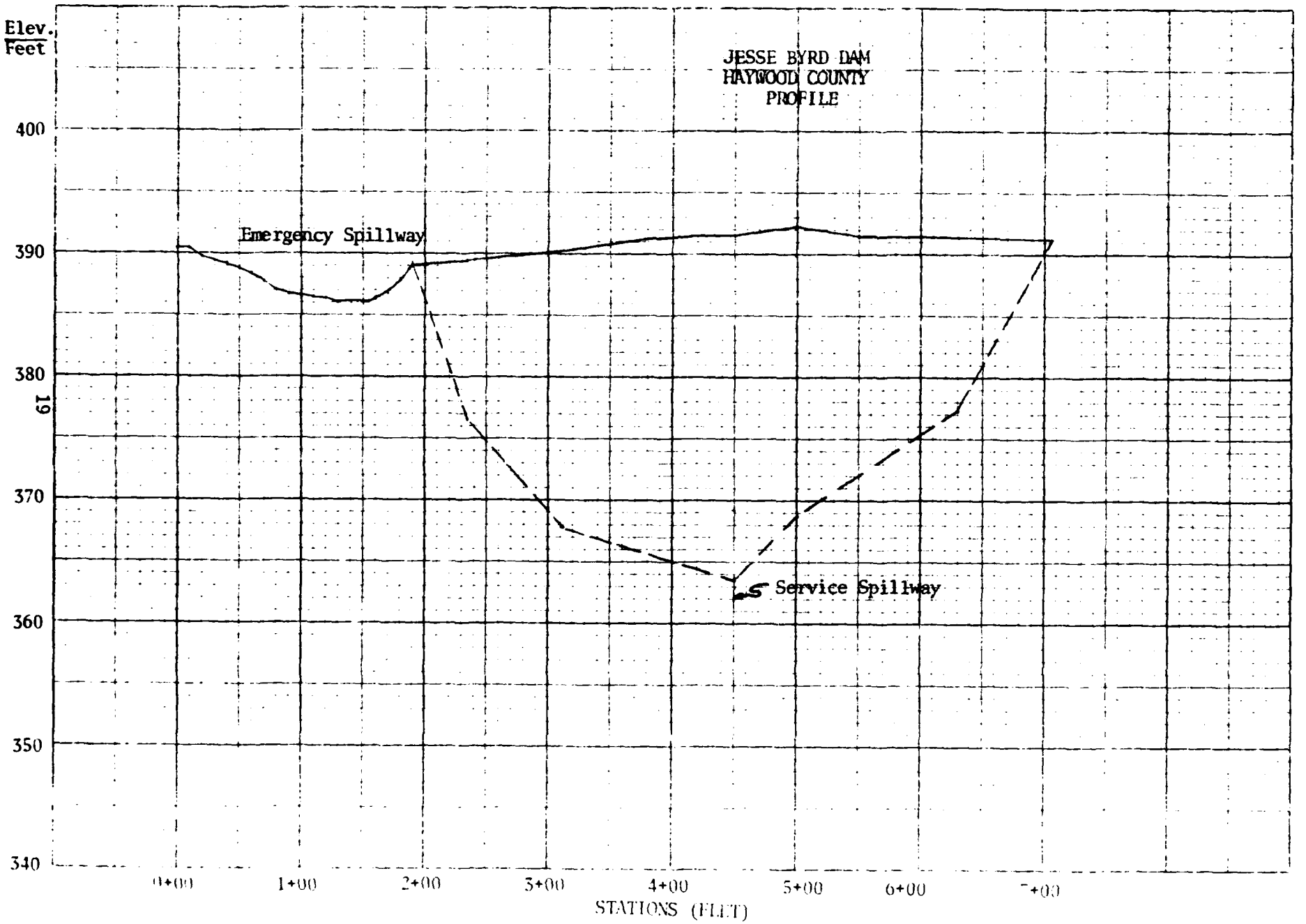
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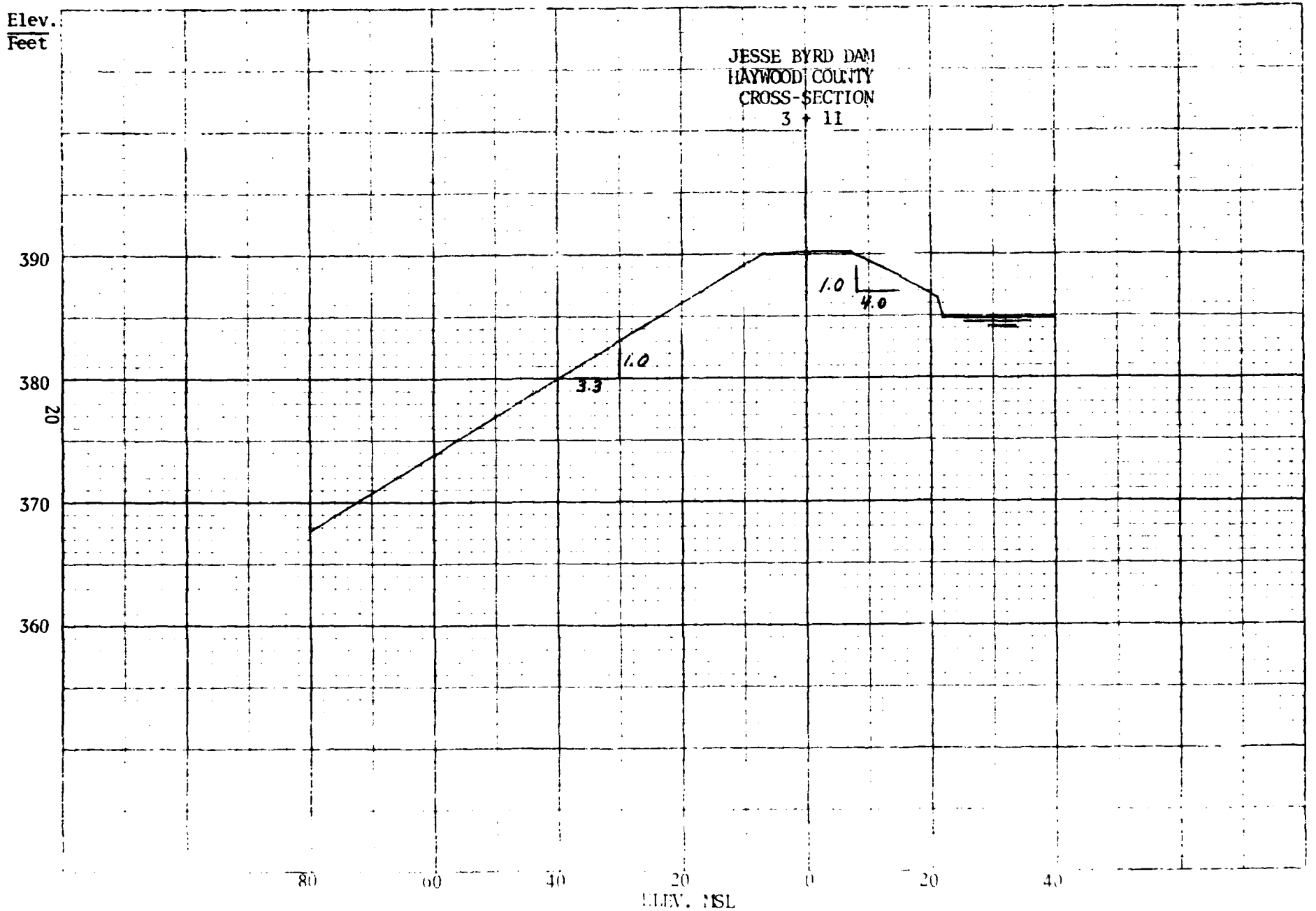
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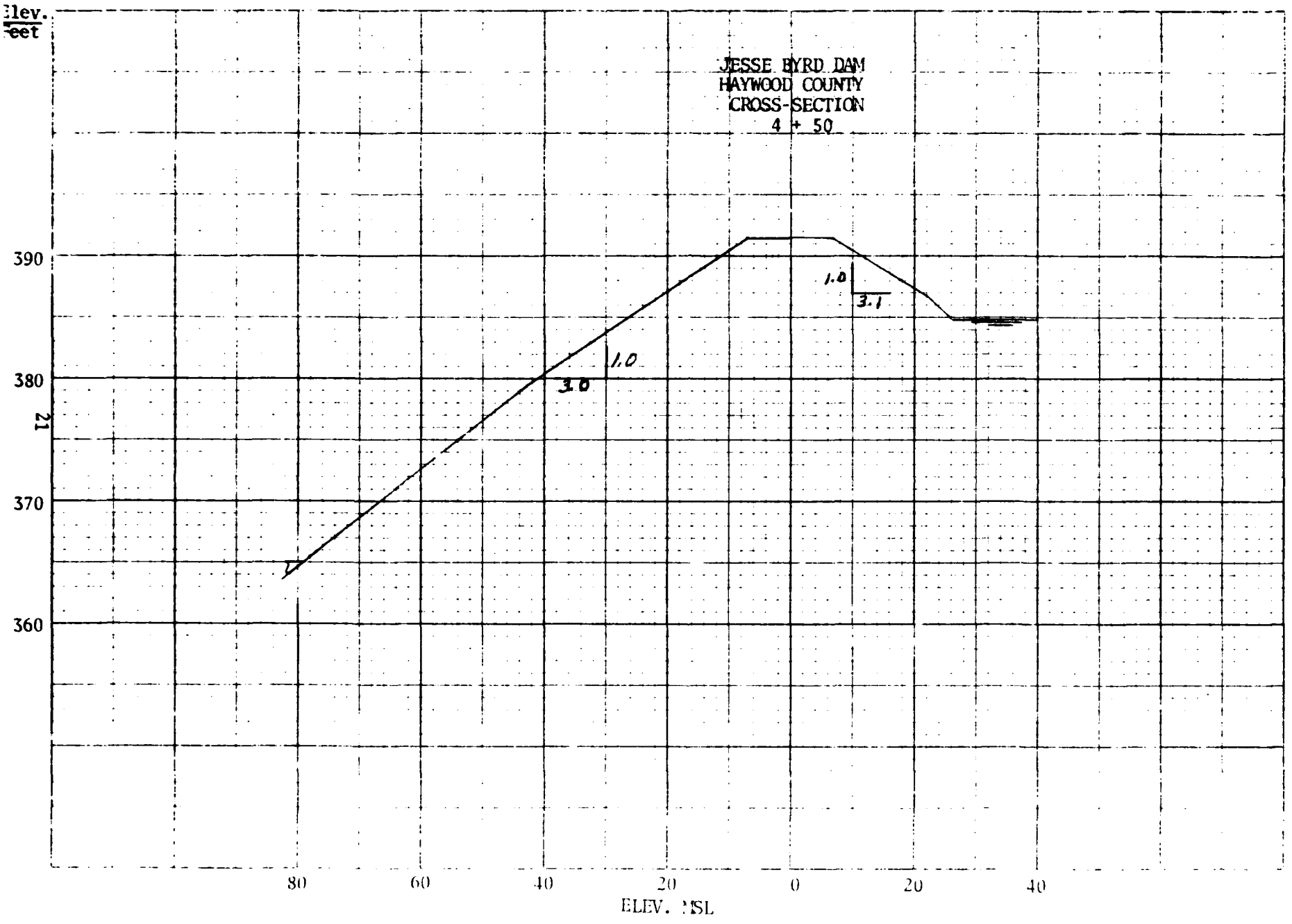
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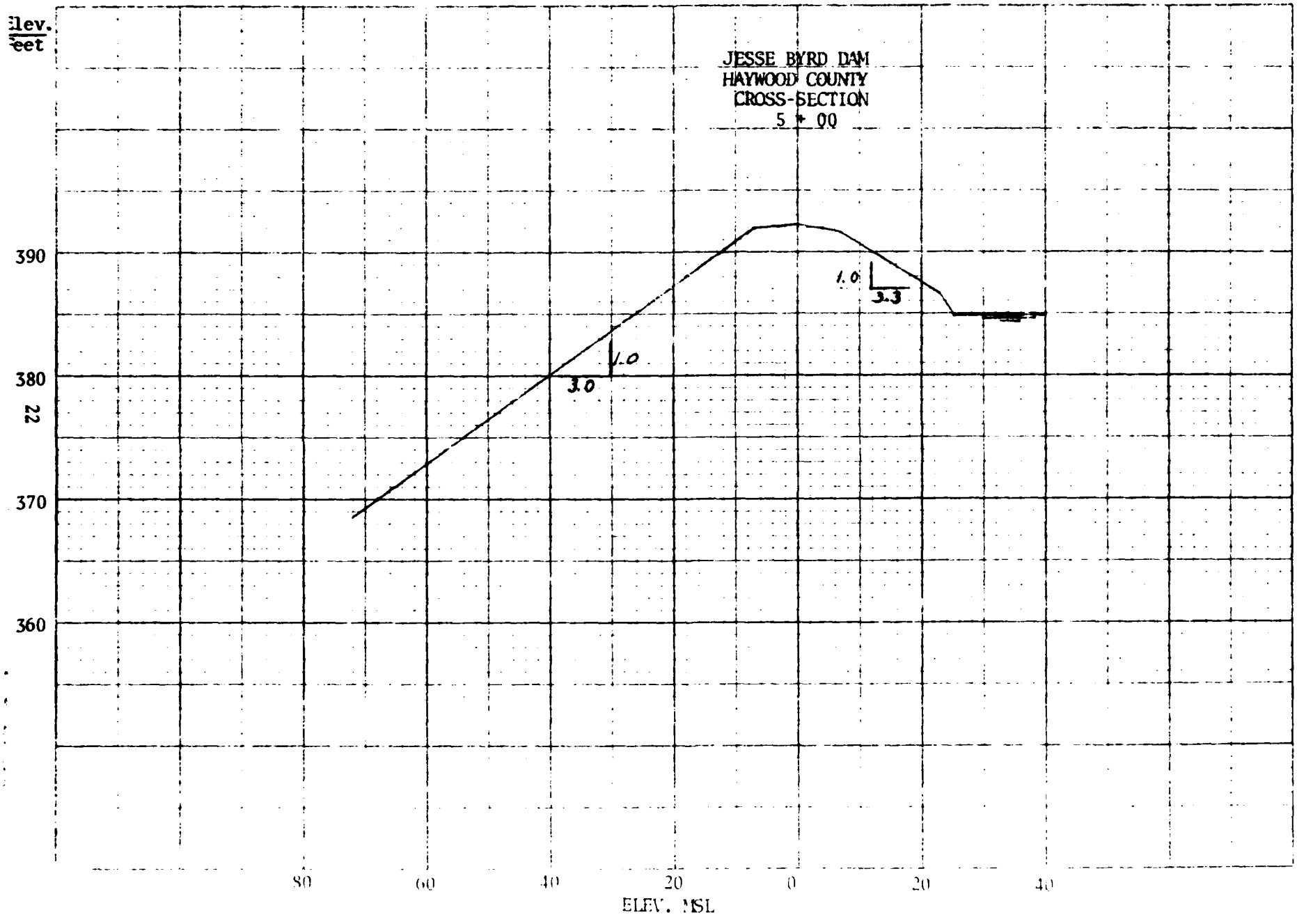
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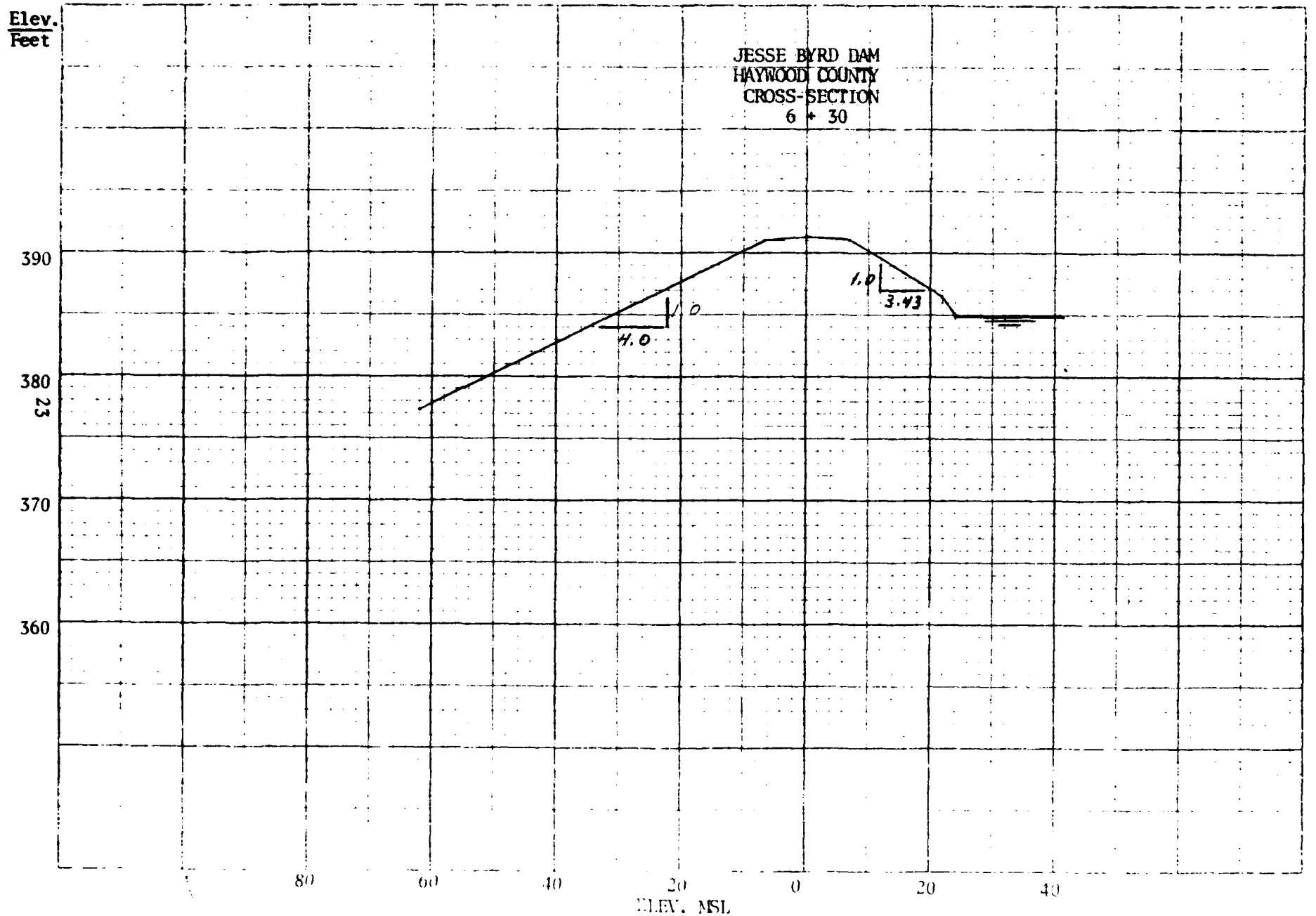
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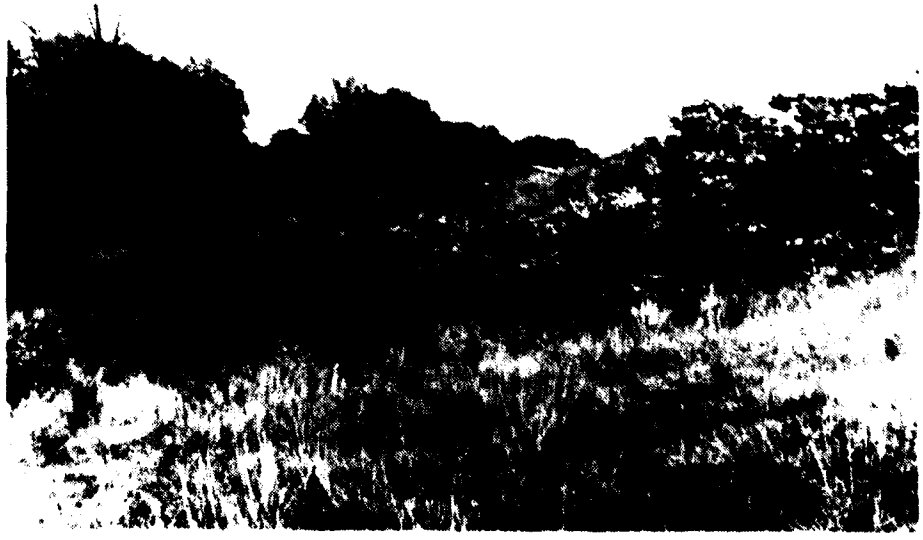
360
1.0
4.0
1.0
3.43
80
60
40
20
0
20
40
ELEV. MSL

APPENDIX C

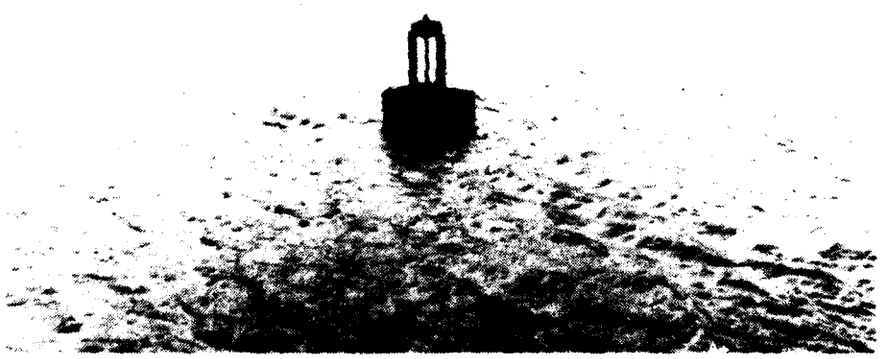
PHOTOGRAPHIC RECORD

1. Top and upstream slope of Byrd Dam. Note emergency spillway at upper left.

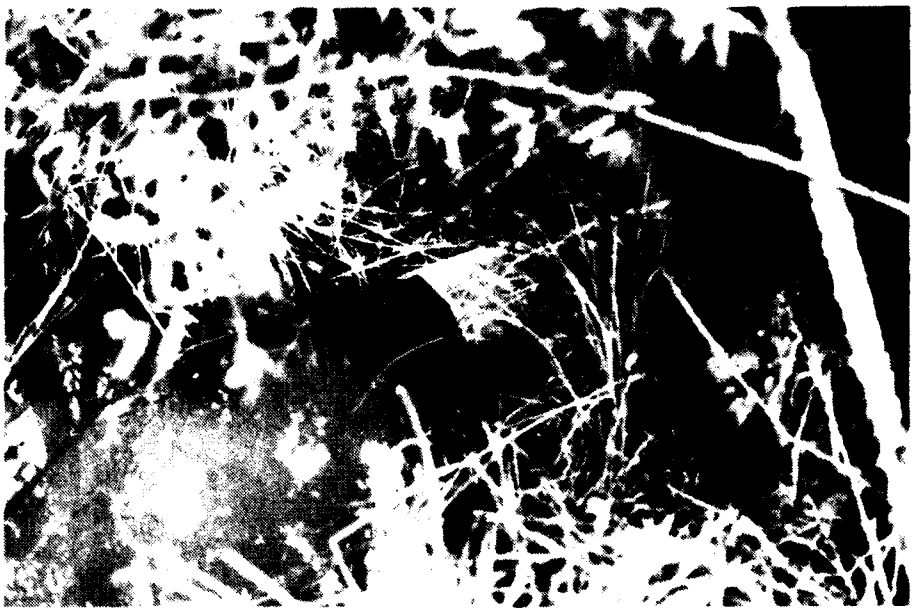


2. Backslope of Byrd Dam. Note erosion at lower right.

3. Height of vegetation on backslope made close observation of slope difficult.



4. Service Spillway Byrd Dam.



5. 12 inch barrel for service spillway Byrd Dam. Note rusted condition.

6. Outfall ditch for service spillway Byrd Dam.

7. Approach section and control section emergency spillway Byrd Dam.

8. Byrd Dam impoundment.

APPENDIX D

INSPECTION TEAM TRIP REPORTS

TRIP REPORT
JESSE BYRD DAM
HAYWOOD COUNTY, TENNESSEE

GENERAL ENGINEERING OBSERVATIONS
May 14, 1981

GENERAL. An engineering inspection of the Byrd Dam was made with Dr. Fred H. Kellogg, Kellogg Engineering, and Ed O'Neill of the Tennessee Division of Water Resources. The weather was cloudy with temperatures in the 70's. The winds were gusty. The lake level was at the crest of the service spillway.

EMBANKMENT. The longitudinal alignment of Byrd Dam is straight with a northeast-southwest orientation. The crest is traversed with an unpaved farm road approximately eight feet in width. The crest elevation appears to fall from the right abutment to left abutment. No longitudinal or traverse surface cracks were noted. The general condition of the surface was good but the sod could be improved. The average top width of the dam is estimated to be ten feet.

The upstream slope is free of undesirable growth and debris. Sloughing is continuous all along the slope at the waterline. The slope is vertical for about 12 inches at the waterline and is benched approximately six feet out below the waterline. The slope above the vertical slough is approximately 3:1 to the crest. There are many crayfish holes just above the water level along the slope. No jugs were observed on this slope. No surface cracks were observed on the upstream slope.

Head high weeds and small saplings made it difficult to observe holes and other deformities on the downstream slope. In a few open areas, deep rills, apparently old, were observed. No surface cracks were observed on the face of the slope nor evidence of heaving at the embankment toe. Recent rain had caused several damp spots at the toe of the slope. There was no mechanical toe drain system installed in this structure. A two foot deep rill has formed above the 12 inch outlet pipe and extends up the backslope.

There is some shallow erosion of the contact of the east abutment of Byrd Dam. There is also erosion at the west abutment ridge in a clay sand. Several springs were observed in the east abutment. These springs seem to occur at about the same elevation as the pool level of the dam. No springs nor indication of seepage in areas a short distance downstream from the embankment-abutment tie-in were observed.

In the area downstream from the embankment there was no localized subsidence observed nor evidence of piping, boils or seepage. Rain had occurred within two hours of the inspection and the runoff water through the pipe was muddy.

INSTRUMENTATION. There were no monuments for survey nor were there any observation wells, weirs, piezometers, or other instrumentation.

SPILLWAYS. Byrd Dam has a 12 inch corrugated metal pipe barrel that extends through the dam and a 15 inch riser with a 36 inch corrugated metal pipe as an antivortex baffle at the top. Installation also has a gate valve similar to the Armco type on the barrel to drain the lake. SCS plans for the Jesse Byrd Dam show that both the 12 inch diameter barrel, riser, and trash rack

all to be asphalt coated. This asphalt coating has sloughed off all the visible portions of the riser and barrel. The riser is now beginning to rust and the outlet end of the barrel is completely rusted. There was no evidence of leakage of the contact with the soil and the outlet pipe.

EMERGENCY SPILLWAY. The emergency spillway is located in the left abutment. The general condition of the approach slope and control section is good. The entrance channel has a good sod and is estimated to have about a one percent entrance slope to the control section. The control section has a good sod and appears to be 15 to 20 feet in length. The exit channel is the natural slope and is experiencing a good deal of gulleying. Debris and hay bales have been thrown into this gullied area to stop the erosion. The service spillway side slopes appear to have taken advantage of a natural swale rather than cut with a flat bottom and 3:1 side slopes.

RESERVOIR. The reservoir slopes appear to be in good condition. Sedimentation within the reservoir in unknown. The lake appeared to be a little muddy at the time of inspection, probably due to the rain that occurred about two hours before the inspection.

RECOMMENDATIONS. No serious deficiencies were noted during this inspection but a few items need attention. Namely, the tall grass and saplings on the backslope should be removed and the backslope inspected in detail after their removal by an engineer qualified in dam inspections. The gulleying on the backslope of the emergency spillway should be filled in and seeded to effectively eliminate the gulleying in the exit slope. The springs in the east abutment

should be monitored and if they continue to flow in the driest part of summer, some method should be used to stop this condition. The service spillway structure should also be recoated to keep the material from rusting through and setting up piping conditions under the structure.

Wm. E. Bush

William E. Bush, P.E., Director
Civil & Water Resources Engineering
Tennessee License No. 4177

BYRD DAM
INSPECTION REPORT

F. H. KELLOGG

INTRODUCTION

The results of an inspection made on 14 May 1981 are presented here. The dam is located about 10 miles east of Brownsville, Tennessee. It is an earth dam 25 ft high, impounding 20 ft of water. The elevation of the top of the dam is 389.3, and that of the emergency spillway, 386.0. Normal pool is at elevation 385. The drainage area is 0.2 square miles. The dam site is located in an area of clayey and silty sand (Groups SC to SM in the Unified Classification System) belonging to the Claiborne Formation. The sand contains many interbeds of silty clay (Group L), and silt (Group ML)that are continuous over large areas. The sands and silts are quite susceptible to erosion. The soils in the dam are cohesive, low-plasticity silts of Group ML. The reservoir is fairly clear. The banks are washed to a steep slope for about a foot above the water line.

EAST (RIGHT) ABUTMENT

The soil here is a clayey sand (Group SC). At the contact between the downstream slope of the dam and the abutment, there is a shallow gulley, mostly well-covered with grass. The abutment has been terraced at the top to reduce erosion. The abutment has a heavy cover of grass.

CREST

The crest is about 700 ft long and 15 ft wide. It has an unstabilized roadway. It has a reasonably good grass cover.

The freeboard at the time of inspection was about 6 ft. The crest is generally level.

UPSTREAM SLOPE

The upstream slope has a good grass cover. The soil is a cohesive silt of Group ML. A terrace has been cut into the slope by wave action that extends under water for 4 to 6 ft. The slope was designed at 1V on 3.2H, and is presently at about that slope. There is some sloughing in the slope above the terrace, but this is covered with a heavy grass growth. The slope is terraced slightly about 2 to 3 ft above water level. About 100 ft from the abutment, the slope is slightly benched, apparently by a tractor. There are numerous crayfish holes just above water level all along the slope. About 150 ft west of the abutment, the soil has sloughed 2 to 3 ft back into the fill. Next to the slough is a rill. The waves are undermining the root structure at the water line here. About 250 ft west of the abutment, opposite the overflow pipe, there is another slough.

The intake structure is a 36" helical corrugated pipe, protected by screen reinforced by steel bars. over a 15" steel pipe 17.3 ft long, which serves as an overflow pipe.

SPILLWAY AND LEFT (WEST) ABUTMENT

The left abutment is fairly flat with a good grass cover, rising well beyond the dam.

The emergency spillway is located at the abutment. The site slopes are flat, and the center at the control section is about 30' wide. There is a good grass cover, but some slight erosion shows in the spillway and a gulley extends down the outlet channel. The abutment and spillway show a clay sand soil (Group SC).

The downstream slope of the abutment is badly washed with a series of gulleys 1 to 2' deep near the base of the slope.

Downstream Slope.

The slope was designed at 2.6:1, and is, in general, at about that slope. The slope is covered with tall grass. Rilling has occurred under this growth just east of the abutment. This is old, inactive erosion. About 100' east, there is active rilling, at Station 3 / 50, and halfway up the slope.

A 18" pipe discharges into a small pool. The outlet from the pool is heavily overgrown with bushes, vines and tall grass. The area near the pool is swampy. A fairly deep (1-1/2-2') gulleyhas developed just above the outlet. Standing water and water in rills was found north of the toe and about 50' east of the outlet. At Station 5 / 10, the soil was muddy with free water about 6" below the surface. An auger boring showed a hard, reasonably dry gray and tan silt about a foot deep, so the water and mud is due to surface wash. Water is flowing in gulleys below the right abutment. The water was followed up to about pool level. Some of the water is coming out of the abutment. It is doubtful that this water is coming from the pool.

Recommendations

This dam poses no serious hazard in its present condition. The erosion below the two abutments may become serious in time. One or two trees on the downstream slope should be removed. If the wet conditions between the outlet and the right abutment persist through the dry part of the summer, the gulley should be filled with gravel.

APPENDIX E

HYDRAULIC AND HYDROLOGIC DATA

HYDRAULICS AND HYDROLOGIC CALCULATIONS

Jesse Byrd Dam is located in Haywood County, Tennessee. The present land use is estimated to be 55 percent pasture and 45 percent cultivated land. The soil association is Grenada-Loring-Memphis and is classified as a "B" soil. The runoff curve number was calculated to be 68 AMC II.

The Jesse Byrd Dam is a small size, high hazard potential dam. As such, it is required to pass a ½ PMF to PMF storm without overtopping. Using the U.S. Weather Service TP-40, the 6-hour PMP was estimated to be 29.3 inches yielding 24.32 inches runoff (RCN 68 AMC II). The ½ PMF which is derived from the Probable Maximum Precipitation was routed with a 12.16 inch runoff (RCN 68 AMC II).

The total inflow into the reservoir is about 112.5 acre-feet with a maximum peak of 860 cfs. Jesse Byrd reservoir has a maximum storage from the crest of the service spillway to the top of the dam of 71 acre-feet and a maximum spillway discharge rate of 337 cfs. The impoundment is sufficient to safely pass the ½ PMF. However, the full PMF storm overtopped the dam by a maximum depth of 1.8 feet for a period of 2.75 hours.

The 6-hour, 100-year flood containing 5.4 inches precipitation was routed through the dam using a RCN of 84 (AMC III). This produced a runoff of 3.64 inches and a routed peak discharge of 29 cfs. Jesse Byrd Dam contained the storm with flows of 1.1 feet in the emergency spillway and a freeboard of 1.8 feet.

The 1-10 day, 100-year storm was routed through the structure and did produce flow in the emergency spillway.

The inflow hydrograph was calculated by methods contained in Section 4, Chapter 21 of the SCS National Handbook. Weir constants in the formula $Q=CLH^{3/2}$ were found in King and Brater "Handbook of Hydraulics", fifth edition. The routing equation used was:

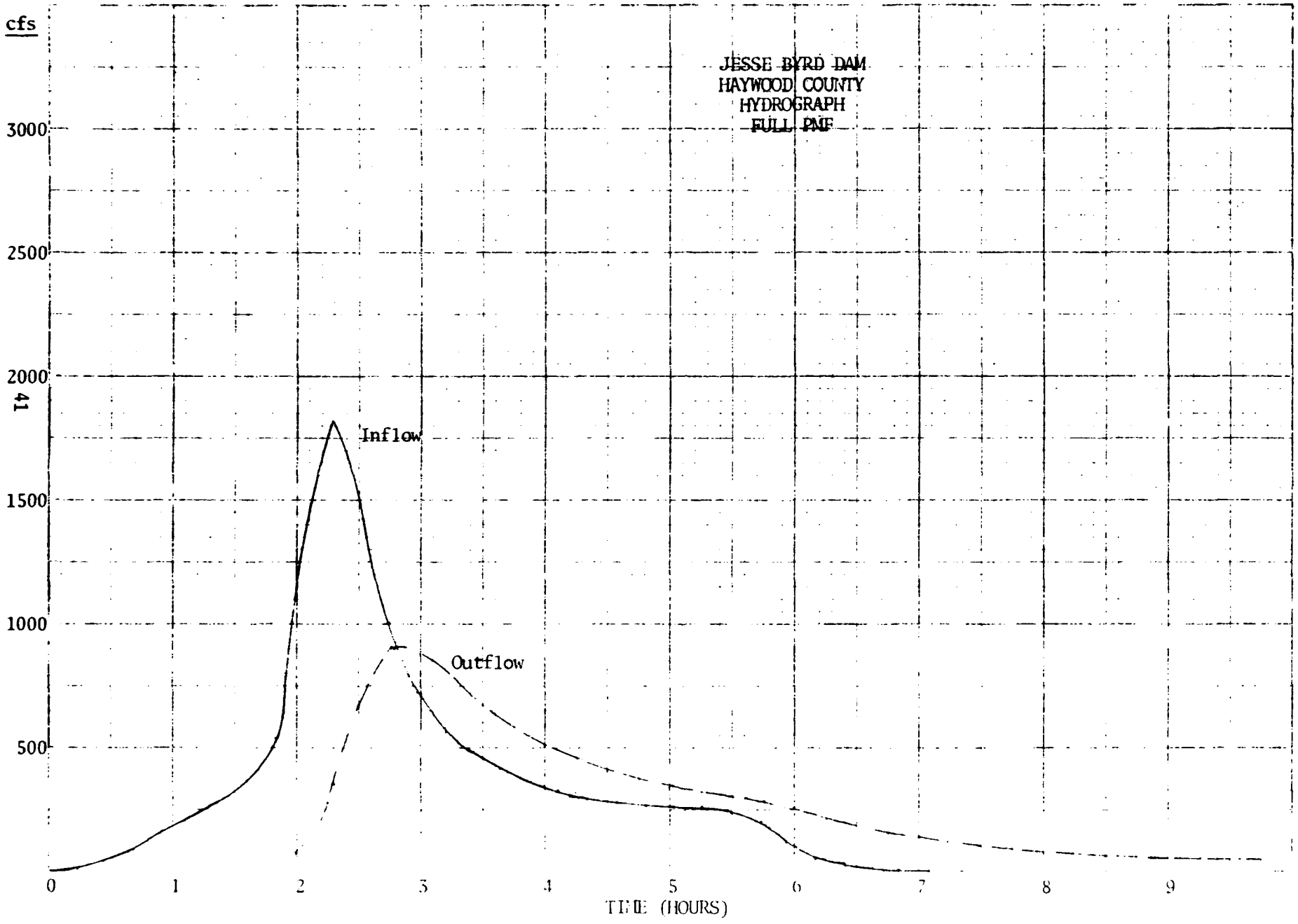
$$I_1 + I_2 + \left(\frac{2S_1}{\Delta t} - O_1\right) = \left(\frac{2S_2}{\Delta t} + O_2\right) .$$

Basic Engineering Data was obtained from the following sources: Engineering surveys of the impoundment structure; U.S. Geologic Survey Topographic Maps; Aerial photographs; USDA Soil Conservation Service Soil Survey Maps; Rainfall Data and Hazard Classification from the Tennessee Division of Water Resources.

HYDRAULIC AND HYDROLOGIC SUMMARY

Frequency of Occurrence	Duration	Antecedent Moisture Condition II	III
100-year	6-hour	Will Pass	Will Pass
100-year	10-day	Spillway Flow Will Occur	Spillway Flow Will Occur
½ PMF[1]	6-hour	Will Pass	Will Pass
PMF	6-hour	Will Overtop 1 ft. for 2.7 hrs.	Will Overtop 1.5 ft. for 2.8 hrs.

[1]Probable Maximum Flood


cfs
JESSE BYRD DAM
HAYWOOD COUNTY
HYDROGRAPH
FULL PMF
3000
2500
2000
1500
1000
500
Inflow
Outflow
0
1
2
3
4
5
6
7
8
9
TIME (HOURS)

NAME OF DAM =BYRD DAM

STORM=FULL PMF, 6 HOURS, AMC II
TIME INCREMENT IN HOURS = 0.25

TIME	I (CFS)	2S/DT-O	2S/DT+O	O(CFS)
0.00	0.00	0.00	0.00	0.00
0.25	7.00	7.00	7.00	0.00
0.50	50.00	64.00	64.00	0.00
0.75	110.00	223.90	224.00	0.05
1.00	180.00	513.10	514.90	0.40
1.25	250.00	939.31	943.10	1.50
1.50	330.00	1506.51	1513.31	6.39
1.75	450.00	2250.27	2263.53	10.13
2.00	1150.00	3713.22	3863.77	24.53
2.25	1313.00	6113.05	6653.22	269.08
2.50	1500.00	8083.52	9483.05	679.77
2.75	1004.00	8777.40	10567.52	895.06
3.00	700.00	8717.22	10431.40	857.09
3.25	550.00	8415.51	9922.22	753.85
3.50	450.00	8073.63	9413.51	670.44
3.75	380.00	7740.11	8913.63	591.76

4.00	290.00	[illegible]	[illegible]	569.12
4.25	300.00	7158.74	[illegible]	451.55
4.50	280.00	[illegible]	[illegible]	406.60
4.75	270.00	6730.44	7435.19	[illegible]
5.00	260.00	6569.07	7253.44	345.69
5.25	250.00	6430.91	7079.07	324.08
5.50	235.00	6305.19	6917.91	305.36
5.75	200.00	6168.26	6743.19	285.95
6.00	100.00	5953.47	6414.29	251.44
6.25	40.00	5651.26	6041.41	201.06
6.50	20.00	5336.49	5711.28	167.54
6.75	0.00	5045.06	5374.49	159.71
7.00	0.00	4778.84	5045.06	137.11
7.25	0.00	4511.00	4779.84	118.92
7.50	0.00	4332.21	4511.00	104.41
7.75	0.00	4147.67	4341.21	99.58
8.00	0.00	3971.41	4147.05	92.37

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[illegible]	0.00	3259.0[illegible]	33[illegible].5[illegible]	[illegible]
[illegible]	0.00	3169.5[illegible]	[illegible]2[illegible].08	[illegible]

FULL PMF 6 HOURS AMC II

HYDROGRAPH COMPUTATION

DATE
COMPUTED BY
CHECKED BY

Project Byrd Dam

DR. AREA 0.173 SQ. MI. STRUCTURE CLASS

T_c 0.52 HR. STORM DURATION 6 HR.

POINT RAINFALL 29.3 IN.

ADJUSTED RAINFALL:

AREAL FACTOR IN.

DURATION FACTOR IN.

RUNOFF CURVE NO. 68

Q 24.32 IN.

HYDROGRAPH FAMILY NO. 1

COMPUTED T_p .364 HR.

T_p 5.55 HR.

(T_c / T_p)

COMPUTED 15.25 ; USED 16

REVISED T_p 0.347

$q_p = \frac{484A}{REV.\ T_p} = 241.30$ CFS.

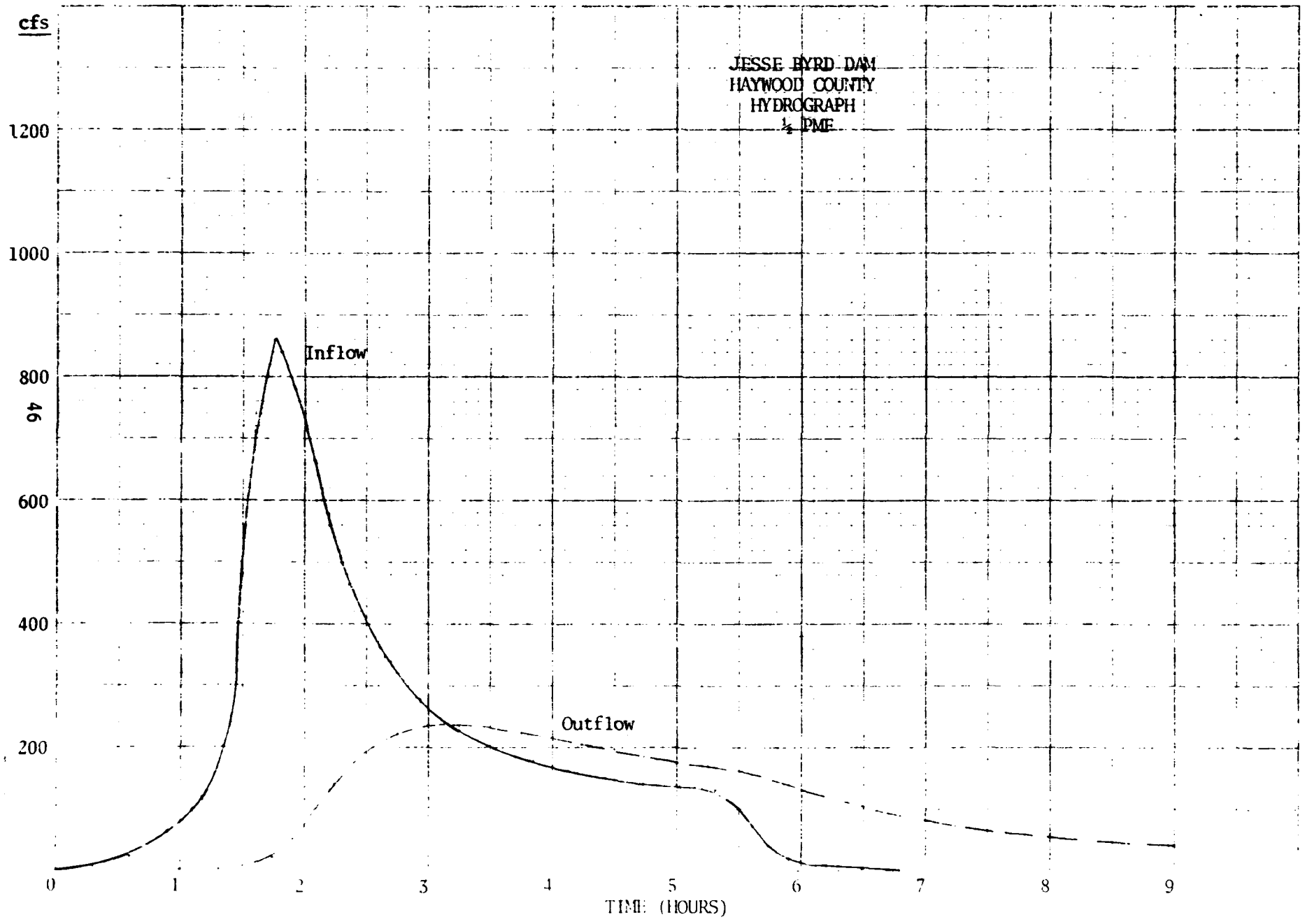
$(Q*q_p)$ = 5868.48 CFS.

t(COLUMN) = t / T_p / REV. T_p q(COLUMN) = q_c / q_p / $(Q*q_p)$

Q(COLUMN) = Q_t Q*Q

	t / T_p / Rev. T_p	q / q_c q_p / $(Q*q_p)$	Q_t / Q_t Q*Q
	t HOURS	q CFS	Q INCHES
1	0	0	0
2	.23	6	
3	.46	35	
4	.69	88	
5	.92	158	
6	1.15	217	
7	1.37	276	
8	1.60	364	
9	1.83	540	
10	2.06	1309	
11	2.29	1813	
12	2.52	1426	
13	2.75	1004	
14	2.98	728	
15	3.21	569	
16	3.44	475	
17	3.66	411	
18	3.89	358	
19	4.12	323	
20	4.35	293	
21	4.58	276	
22	4.81	264	
23	5.04	258	
24	5.27	252	
25	5.50	235	
26	5.73	200	
27	5.95	117	
28	6.18	47	
29	6.41	23	
30	6.64	12	
31	6.84	6	
32	7.10	0	
33		12083	
34	Check:	12083(.23) / 645(.173)	= 24.91"

Wilbert Simmonds, Consulting Associates, Inc
931 SOUTH BARKSDALE STREET P O BOX [illegible] MEMPHIS, TENNESSEE 38104
TELEPHONE 901 [illegible]
Systems Engineers


cfs
JESSE BYRD DAM
HAYWOOD COUNTY
HYDROGRAPH
½ PMF
1200
1000
800
600
400
200
Inflow
Outflow
0
1
2
3
4
5
6
7
8
9
TIME (HOURS)

NAME OF DAM =EVKO DAM

STORM=1/2 PMF, 6 HOURS, HMC 1
TIME INCREMENT IN HOURS = 0.25

TIME	I (CFS)	2S/DT+O	2S/DT+O	O (CFS)
0.00	0.00	0.00	0.00	0.00
0.25	5.00	5.00	5.00	0.00
0.50	20.00	30.00	30.00	0.00
0.75	45.00	94.99	95.00	0.01
1.00	80.00	219.90	219.99	0.05
1.25	150.00	449.32	449.90	0.29
1.50	500.00	1093.75	1099.32	2.80
1.75	860.00	2410.31	2453.73	21.71
2.00	720.00	3840.10	3943.31	75.06
2.25	540.00	4819.30	5113.18	146.40
2.50	400.00	5276.41	5739.38	141.45
2.75	320.00	5353.7	6044.49	221.35
3.00	260.00	5 65.2	6213.29	274.3
3.2	2 .00	2 0 3	62 6.21	38.0
3.5	1 .00	.. ..	5 1.09	1 1.2
3.7	5 .00	5 5.3	6113.61	2 3.17
4.00	2 .00	2 1.	6 13.57	1 1.41
4	1 .00	2 1.	5 .05	1 .00

4.50	145.00	5412.44	58[illegible].73	[illegible]8.14
4.75	140.00	5324.97	56[illegible]7.44	14[illegible].24
5.00	135.00	5243.54	55[illegible]4.97	[illegible]
5.25	130.00	5166.77	55[illegible]3.54	[illegible]
5.50	100.00	5072.41	55[illegible].77	162.18
5.75	40.00	4915.58	52[illegible].41	[illegible]0.42
6.00	10.00	4703.31	49[illegible].58	131.14
6.25	5.00	4488.96	4714.31	115.18
6.50	3.00	4294.17	4497.96	101.84
6.75	0.00	4115.91	4297.18	[illegible]
7.00	0.00	3953.34	4115.81	[illegible]
7.25	0.00	3806.75	3952.84	[illegible]
7.50	0.00	3673.60	3803.78	[illegible]
7.75	0.00	3552.01	3672.60	[illegible]
8.00	0.00	3440.40	3551.03	55.[illegible]
8.25	0.00	3337.6	3443.46	.1

8.50	0.00	3242.43	3337.61	47.59
8.75	0.00	3154.02	3242.43	44.20
9.00	0.00	3071.63	3154.02	41.19
9.25	0.00	2994.62	3071.63	38.50
9.50	0.20	2922.45	2994.62	36.09
9.75	0.00	2854.62	2922.45	33.91
[illegible]	0.00	2790.75	2854.62	31.94

½ PMF - 6 HOURS AMC II

HYDROGRAPH COMPUTATION

DATE
COMPUTED BY
CHECKED BY

Project Byrd Dam

DR. AREA 0.173 SQ. MI. STRUCTURE CLASS

T_c 0.52 HR. STORM DURATION 6 HR.

POINT RAINFALL 16.73 IN.

ADJUSTED RAINFALL:

AREAL FACTOR IN.

DURATION FACTOR IN.

RUNOFF CURVE NO. 68

Q 12.16 IN.

HYDROGRAPH FAMILY NO. 2

COMPUTED T_p 0.364 HR.

T_p 5.24 HR.

(T_c / T_p)

COMPUTED 14.4 ; USED 16

REVISED T_p 0.328

$q_p = \frac{484}{REV\ T_p}$ = 255.28 CFS.

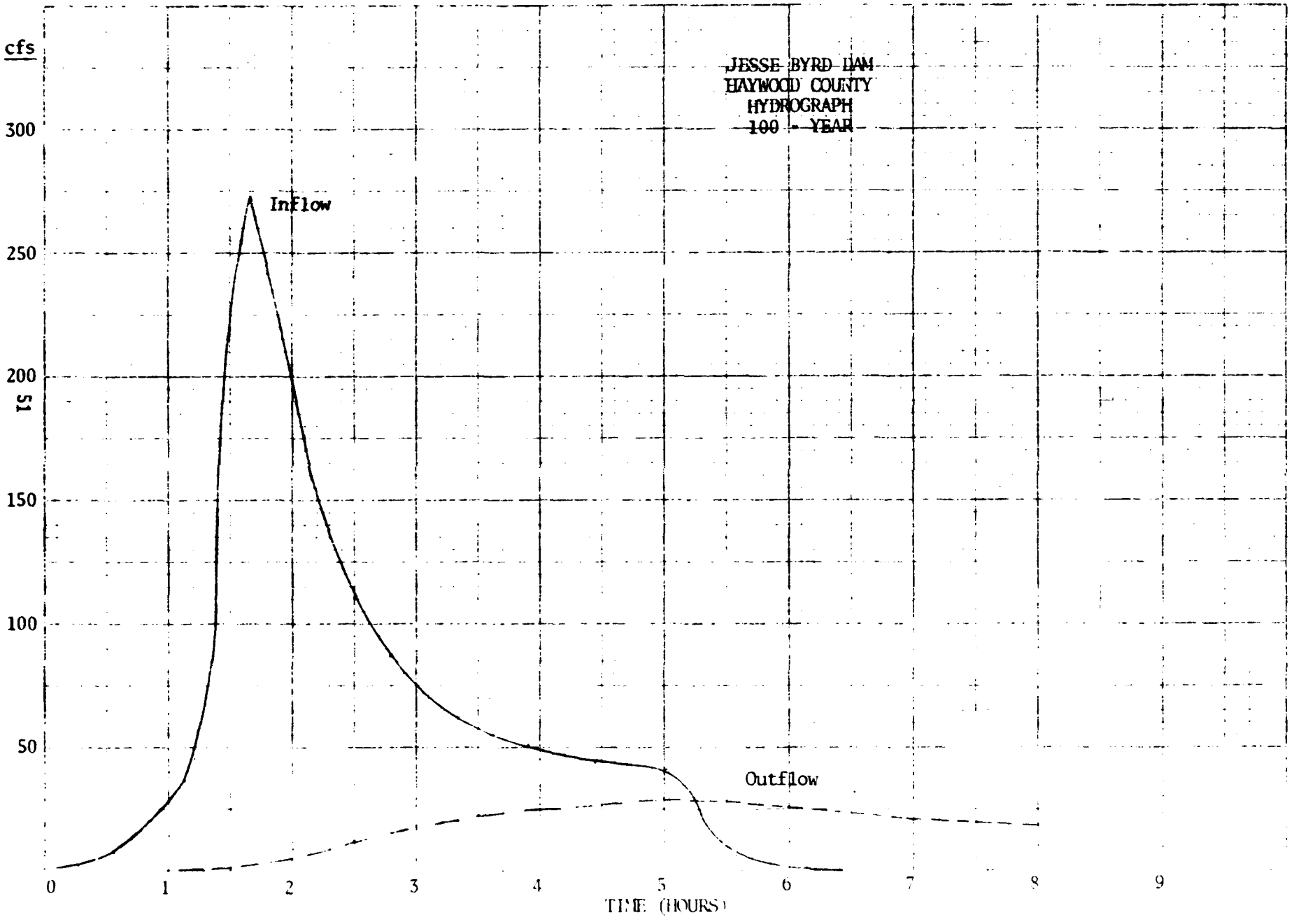
$(Q*)_p$ = 3104.21 CFS.

q(COLUMN) = (t / T_p) REV. T_p q(COLUMN) = (q_c / q_p) $(Q*)_p$

Q(COLUMN) = Q_t Q

	t / T_p Rev. T_p	q / q_c q_p $(Q*)_p$	Q_t / Q_c Q
	t HOURS	q CFS	Q INCHES
1	0	0	0
2	0.30	6	
3	0.59	22	
4	0.89	62	
5	1.18	115	
6	1.48	459	
7	1.77	860	
8	2.07	664	
9	2.36	463	
10	2.66	348	
11	2.95	273	
12	3.25	227	
13	3.54	198	
14	3.84	174	
15	4.13	161	
16	4.43	149	
17	4.72	140	
18	5.02	137	
19	5.31	130	
20	5.61	71	
21	5.90	19	
22	6.20	9	
23	6.49	3	
24	6.79	0	
25		4688	
26			
27	Check: $\frac{4688\ (.30)}{645(.173)}$ = 12.60"		
28			
29			
30			
31			
32			
33			
34			

Wilson-Sigmon-Woods, Consulting Engineering Associates, Inc
921 SOUTH BARKSDALE STREET P O BOX [illegible] MEMPHIS, TENNESSEE 38104
TELEPHONE 901 [illegible]
Systems Engineers


cfs
JESSE BYRD DAM
HAYWOOD COUNTY
HYDROGRAPH
100 - YEAR
300
250
200
150
100
50
Inflow
Outflow
0
1
2
3
4
5
6
7
8
9
TIME (HOURS)

NAME OF DAM =BYRD DAM

STORM=100 YEAR, 6 HOURS, AMC III
TIME INCREMENT IN HOURS = 0.25

TIME	I (CFS)	2S/DT+O	2S/DT+O	I (CFS)
0.00	0.00	0.00	0.00	0.00
0.25	2.00	2.00	2.00	0.00
0.50	7.00	11.00	11.00	0.00
0.75	15.00	33.00	33.00	0.00
1.00	29.00	76.99	77.00	0.00
1.25	60.00	165.95	165.99	0.02
1.50	225.00	450.37	450.95	0.29
1.75	272.00	943.54	947.37	1.91
2.00	200.00	1404.87	1415.54	5.3
2.25	145.00	1731.55	1749.87	9.16
2.50	110.00	1961.22	1983.55	12.67
2.75	90.00	2129.81	2151.22	15.70
3.00	75.00	2258.21	2284.01	18.30
3.25	64.00	2356.36	2387.21	20.46
3.50	57.00	2432.81	2467.30	22.24
3.75	53.00	2495.26	2532.71	23.73
4.00	51.00	2547.00	2587.26	24.93

4.25	46.00	2589.63	2642.06	26.22
4.50	44.00	2625.27	2679.63	27.10
4.75	43.00	2656.21	2712.27	28.03
5.00	40.00	2681.71	2735.21	[illegible]
5.25	28.00	2691.66	2749.71	29.03
5.50	10.00	2672.67	2729.66	28.49
5.75	3.00	2631.00	2688.67	27.24
6.00	1.00	2582.95	2640.00	26.04
6.25	0.50	2534.85	2594.43	24.78
6.50	0.00	2488.16	2543.36	23.60
6.75	0.00	2443.17	2445.16	22.49
7.00	0.00	2400.22	2404.17	21.47
7.25	0.00	2359.12	2411.23	20.52
7.50	0.00	2319.9	2378.19	19.64
7.75	0.00	2281.28	2319.91	18.81
8.00	0.00	2246.12	2282.28	18.05
8.25	0.00	2211.54	2241.19	17.33

100 YEAR 6 HOURS AMC III

HYDROGRAPH COMPUTATION

DATE
COMPUTED BY
CHECKED BY

Project Byrd Dam

DR. AREA 0.173 SQ. MI. STRUCTURE CLASS

T_c 0.52 HR. STORM DURATION 6 HR.

POINT RAINFALL 5.4 IN.

ADJUSTED RAINFALL:

AREAL FACTOR IN.

DURATION FACTOR IN.

RUNOFF CURVE NO. 84

Q 3.64 IN.

HYDROGRAPH FAMILY NO. 2

COMPUTED T_p 0.364 HR.

T_p 5.00 HR.

(T_c / T_p)

COMPUTED 13.74 ; USED 16

REVISED T_p 0.31

$q_p = \frac{\text{AREA}}{\text{REV. } T_p}$ = 270.10 CFS.

$(Q*q_p)$ = 283.18 CFS.

t COLUMN = (t / T_p) REV. T_p q COLUMN = $(q_c / q_p)(Q*q_p)$

Q COLUMN = $(Q_t / Q)Q$

	t HOURS	q CFS	Q INCHES
1	0	0	0
2	.28	2	
3	.56	7	
4	.84	20	
5	1.12	36	
6	1.40	146	
7	1.67	272	
8	1.95	210	
9	2.23	146	
10	2.51	110	
11	2.79	87	
12	3.07	72	
13	3.35	62	
14	3.63	55	
15	3.91	51	
16	4.19	47	
17	4.46	44	
18	4.74	43	
19	5.02	41	
20	5.30	23	
21	5.58	6	
22	5.86	3	
23	6.14	1	
24	6.42	0	
25		1485	
26			
27	Check: 1485 (.28)		= 3.73"
28	645(.173)		
29			
30			
31			
32			
33			
34			

Wilson-Simmonds Consulting Associates, Inc
921 SOUTH BARKSDALE STREET P O BOX [illegible] MEMPHIS TENNESSEE 38104
TELEPHONE 901 [illegible]
Systems Engineers

****
POWER CURVE FIT EQUATION
****

PROJECT = BYRD DAM

Y=A*X^B

A = 4.87458E-03

B = 2.55137E+00

COEF. OF DETERMINATION= 1.000

****

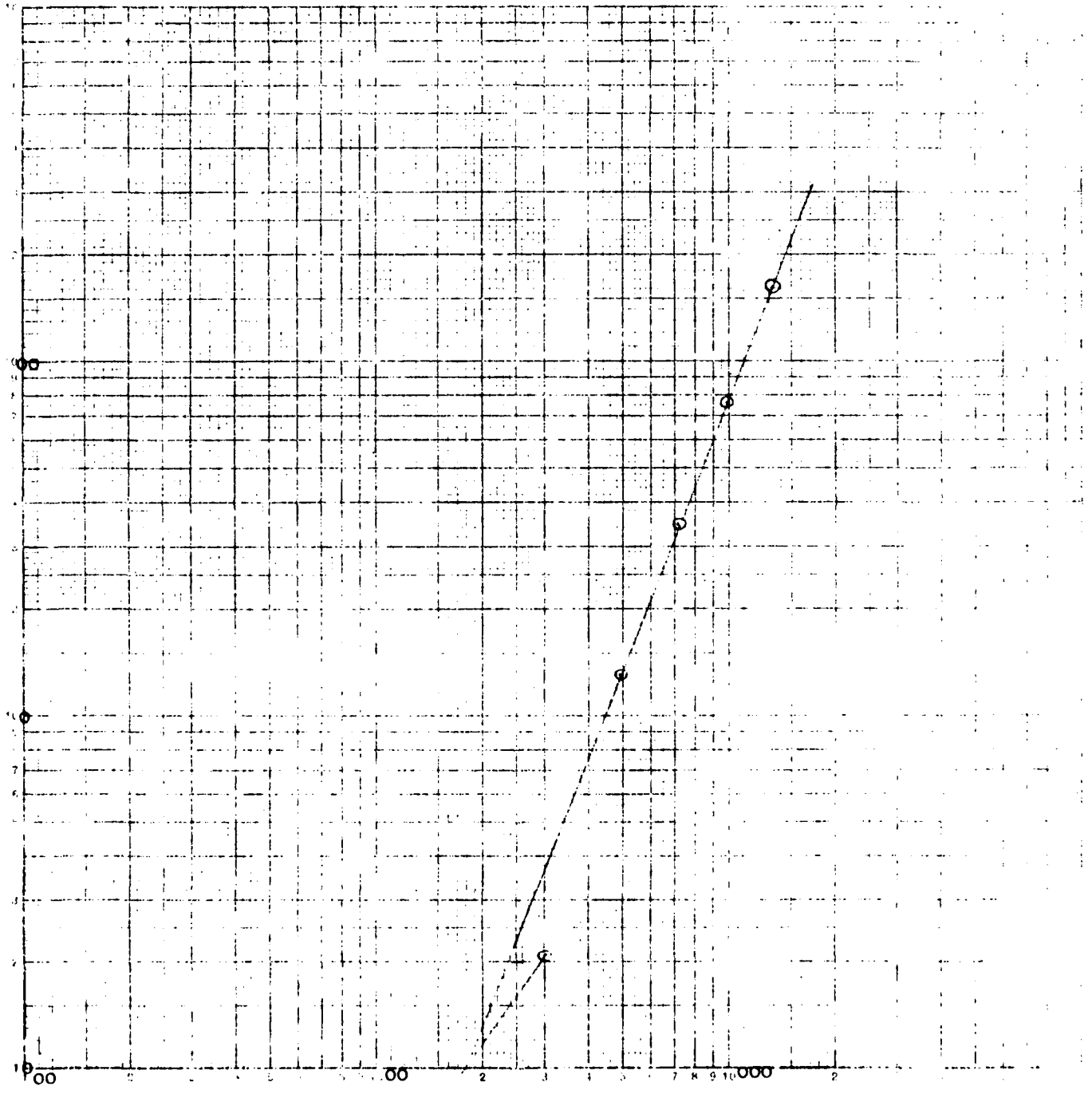
FOR X= 4971.00000 THEN PROJECTED Y= 131.47712

FOR X= 7518.00000 THEN PROJECTED Y= 340.54057

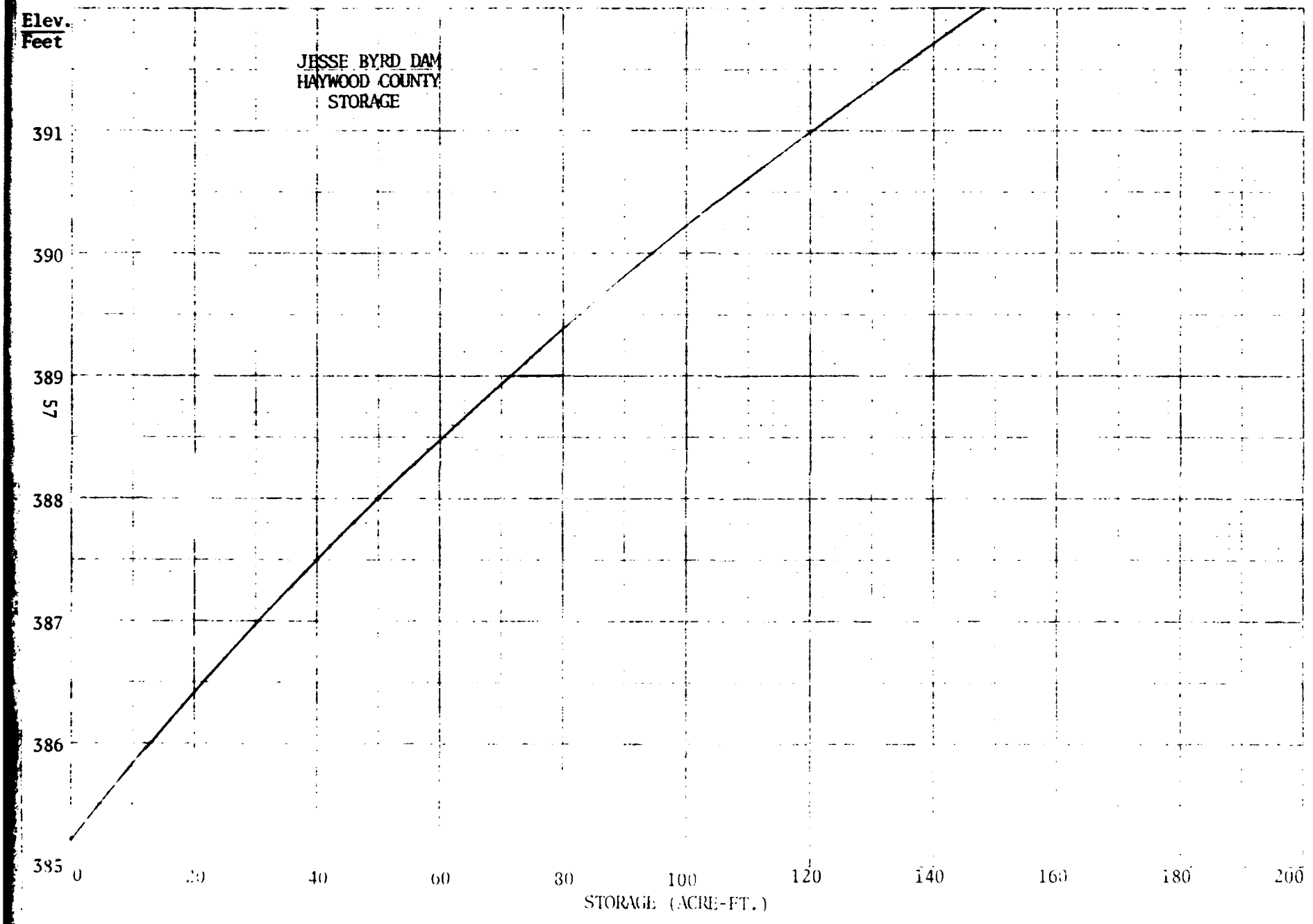
FOR X= 3958.00000 THEN PROJECTED Y= 773.99040

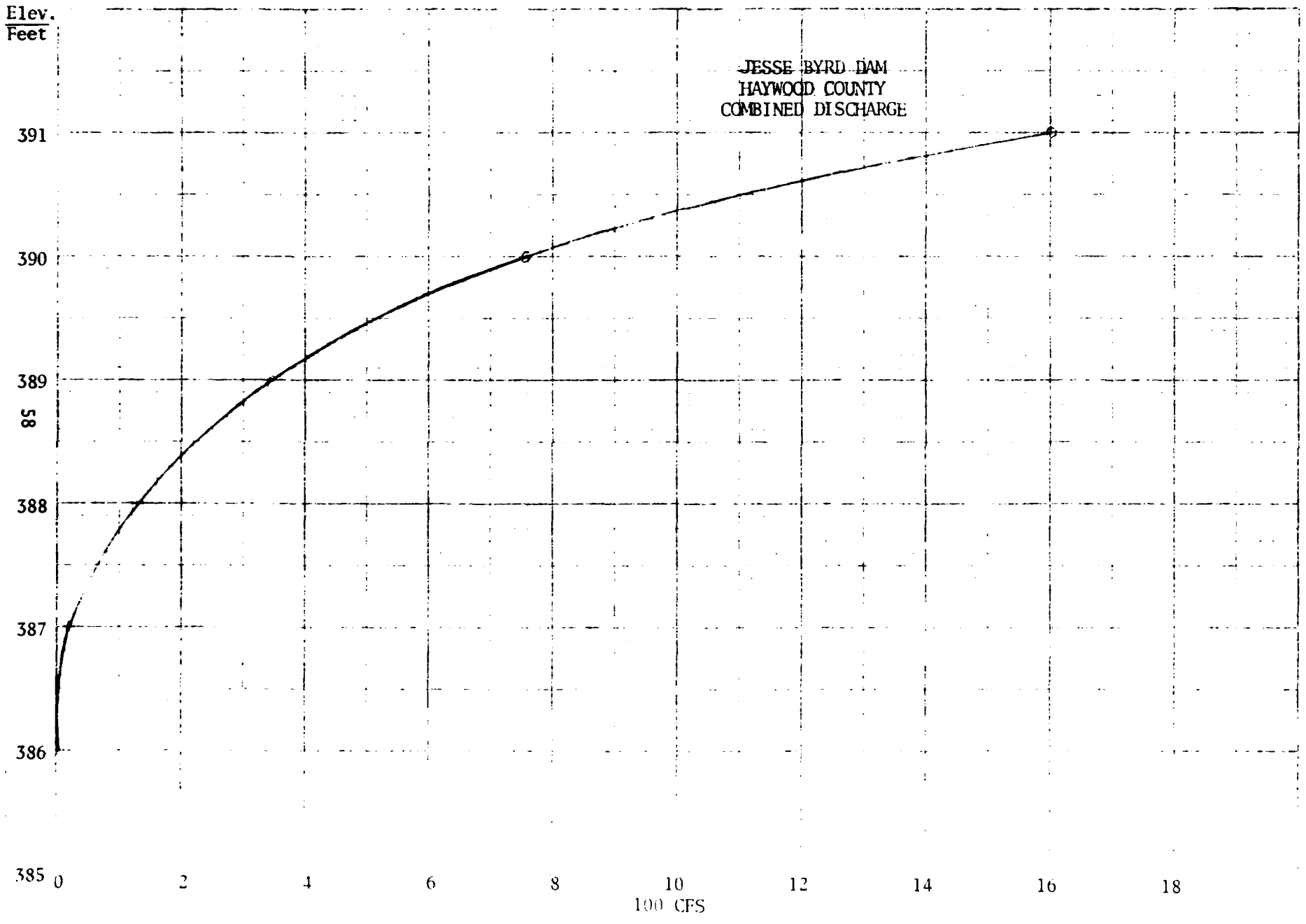
FOR X= 10227.00000 THEN PROJECTED Y= 1596.95050

STORAGE INDICATION CURVE
JESSE BYRD DAM

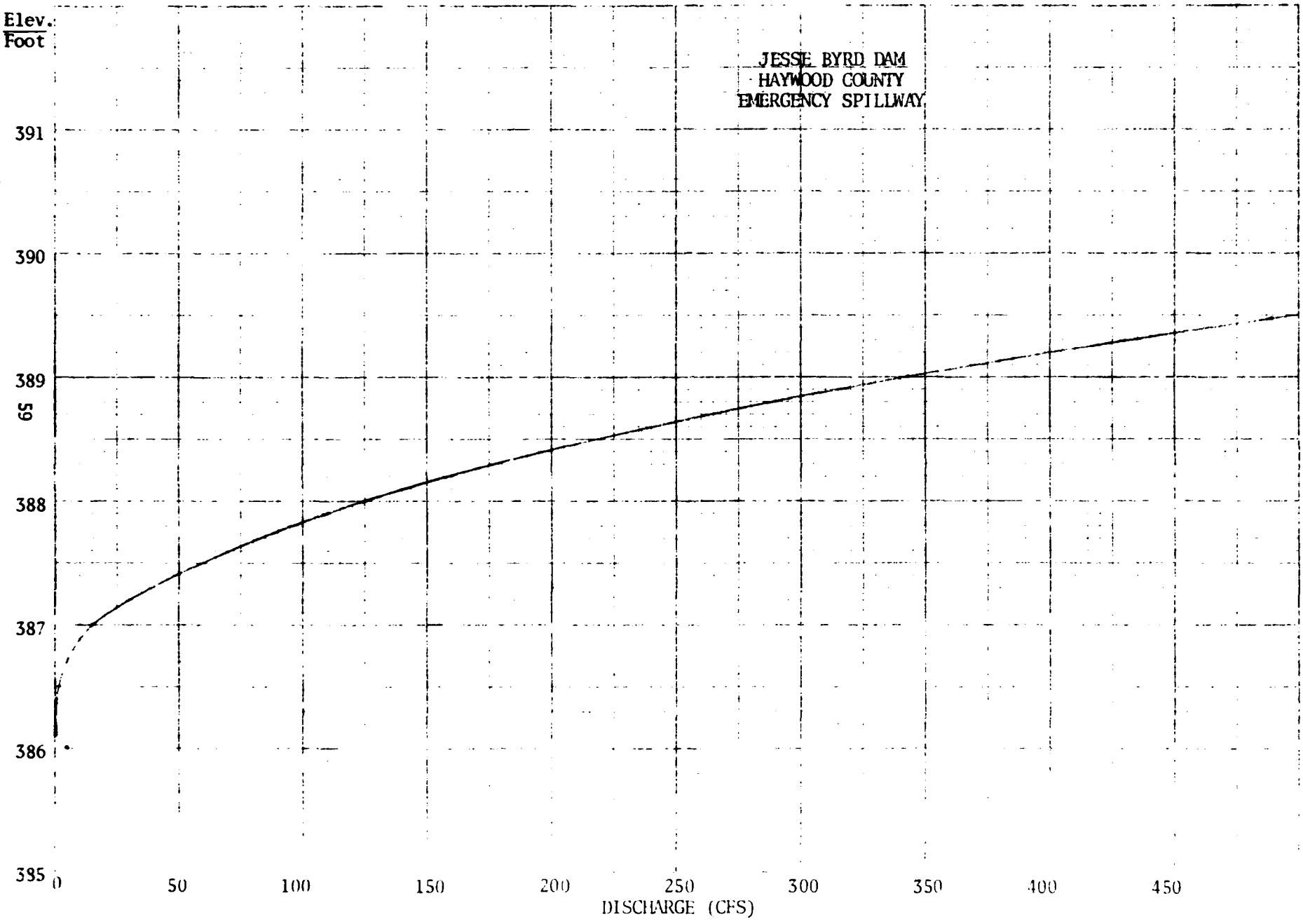


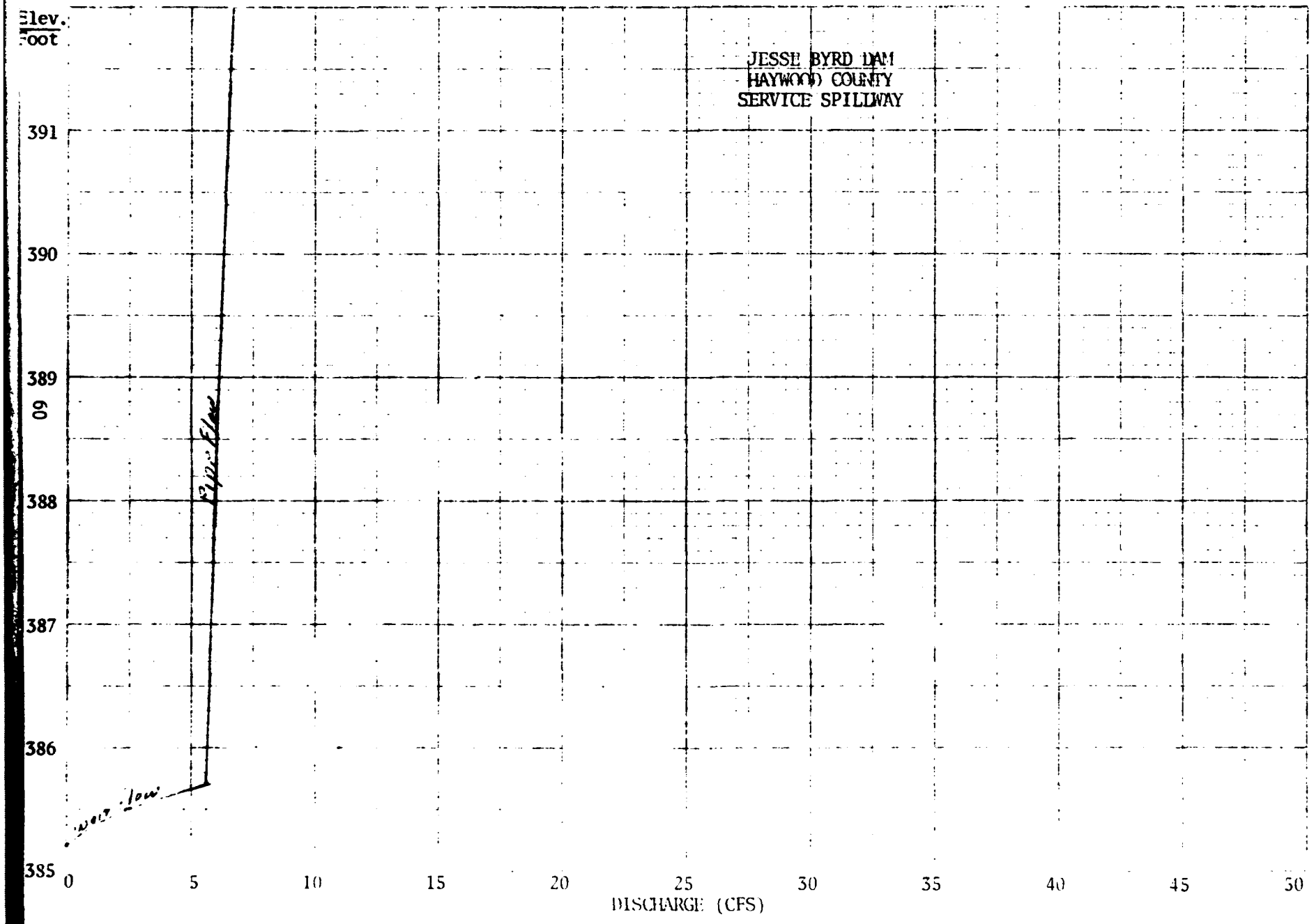
$$\frac{2S}{dt} + O$$


Elev.
Feet
JESSE BYRD DAM
HAYWOOD COUNTY
STORAGE
391
390
389
388
387
386
385
0
20
40
60
80
100
120
140
160
180
200
STORAGE (ACRE-FT.)


Elev.
Feet
JESSE BYRD DAM
HAYWOOD COUNTY
COMBINED DISCHARGE
391
390
389
388
387
386
385
0
2
4
6
8
10
12
14
16
18
100 CFS

58


Elev.
Foot
JESSE BYRD DAM
HAYWOOD COUNTY
EMERGENCY SPILLWAY
391
390
389
388
387
386
385
0
50
100
150
200
250
300
350
400
450
DISCHARGE (CFS)


JESSE BYRD DAM
HAYWOOD COUNTY
SERVICE SPILLWAY
Elev.
Foot
391
390
389
388
387
386
385
0
5
10
15
20
25
30
35
40
45
50
DISCHARGE (CFS)

JESSE BYRD DAM
DISCHARGE COMPUTATIONS - SERVICE SPILLWAY

18" pipe

WEIR FLOW

$L = \pi D = T(1.5) = 4.71'$

$Q = 3.1\ L\ H^{3/2}$

Elev.	H (ft)	Q (cfs)
385.20	0	0
385.50	.3	2.40
386.00	.8	10.45
386.50	1.3	21.64
387.00	1.8	35.26
387.50	2.3	50.93

ORIFICE FLOW

$Q = CA\sqrt{2gh}$ $\quad C = 0.6$ $\quad A = \frac{\pi D^2}{4} = \frac{\pi (1.5)^2}{4} = 1.77\ ft^2$

$= 1.06\sqrt{64.4\ h}$

Elev.	H (ft)	Q (cfs)	Elev.	H	Q
385.50	.3	4.66	388.50	3.3	15.45
386.00	.8	7.61	389.00	3.8	16.58
386.50	1.3	9.70	389.50	4.3	17.64
387.00	1.8	11.41			
387.50	2.3	12.90			
388.00	2.8	14.23			

JESSE BYRD DAM
PIPE FLOW CALCULATIONS

L_{18} = 16 ft.

L_{12} = 140 ft.

$K_e = 1.0\ V^2/2g$

$K_f = \frac{5087\ n^2}{d_{inches}^{4/3}}$ $\qquad 18'' = \frac{5087 \times 0.027^2}{18^{4/3}} = 0.079$

$12'' = \frac{5087 \times 0.027^2}{12^{4/3}} = 0.135$

$H_{total} = (16 \times 0.079 \times V_{18}^2/2g) + (140 \times 0.135\ V_{12}^2/2g + 1.0\ V_{12}^2/2g)$

Assume Q = 5 cfs $\quad V_{18}$ = 2.83 1/sec. $\quad V_{12}$ = 6.37 1/sec. $\quad H_t$ = 12.69 ft.
Q = 7.5 cfs $\quad V_{18}$ = 4.24 1/sec. $\quad V_{12}$ = 9.55 1/sec. $\quad H_t$ = 28.53 ft.

EMERGENCY SPILLWAY

n = 0.06

Parabolic section
Depth 2.9 feet
slope = 0.001 ft/ft

$V = 1.486\ S^{1/2}\ R^{2/3}$ $\qquad R = \frac{A}{WP}$

$Q = VA$

Elev.	A	WP	R	$R^{2/3}$	$S^{1/2}$	7	V ft/sec.	Q (cfs)
386.0	0	-	-	-	.0316	.06	0	0
387.0	55	109	.202	.344	.0316	.06	.269	14.8
388.0	150	136	1.103	1.068	.0316	.06	.836	125.4
389.0	290	159	1.824	1.493	.0316	.06	1.17	339.3
390.0	455	188	2.420	1.803	.0316	.06	1.411	642.1
391.0	645	207	3.116	2.134	.0316	.06	1.670	1077.3

APPENDIX F

DAM INVENTORY DATA SHEET

DAM INVENTORY DATA SHEET
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

[illegible] STATE(ID): 38-7024 FEDERAL(FED ID): ______

[illegible](PROJECT): ______ REGION(R): [illegible]est

[illegible]: Jesse Byrd

[illegible]: Route 3, Brownsville, TN 38012

[illegible] RESIDENCE: 772-1843 BUSINESS: ______

[illegible]: [illegible]wood QUAD: 430NE-Bells

[illegible] LATITUDE: 35° 3[illegible]' 59", LONGITUDE: 89° 04'- 29"

[illegible](SOURCE): Trib. S. Fork Forked Deer RIVER MILE: ______ BASIN: 40C

[illegible] OF DAM: Recreation YEAR COMPLETE: 1975

[illegible](CONT): Jesse Byrd LOCATION: ______

[illegible](ENG): SCS LOCATION: ______

[illegible] OF DAM(TYC): Earth SIZE CLASSIFICATION: Small

[illegible]STREAM HAZARD POTENTIAL CLASSIFICATION STATE(H) 1 FEDERAL(FH) High

[illegible] EXPIRATION DATE(EXP DATE): ______

[illegible] HEIGHT(SHT): 2[illegible].1 FEET, HYDRAULIC HEIGHT(HHT): 19.7 FEET

[illegible] LENGTH(LGTH): 560 FEET, CREST WIDTH(WDTH): 14 FEET

[illegible] SLOPE(U/S): 3.[illegible] :1, DOWNSTREAM SLOPE (D/S): 2.[illegible]:1

[illegible] AREA NORMAL(NSURF): 14.[illegible] ACRES, MAXIMUM(M/SURF): 15.6 ACRES

ELEVATION(FEET MSL), STORAGE CAPACITY(ACRE-FEET)

[illegible] DAM	(ELEV1)	389.3	(TO/STR)	17[illegible].2
[illegible] SPILLWAY CREST	(ELEV2)	386.0	(EM/STR)	128.3
[illegible]POOL	(ELEV3)	385.0	(N/STR)	113.7

[illegible] SPILLWAY MATERIAL(ESM) Veg earth, SIZE(SZ) 167' top w

[illegible] SPILLWAY MATERIAL(SSM) CMP, SIZE(SZ) 1' dia

[illegible] AREA(DA): .[illegible] SQ. MILES, CURVE NUMBER(CN): ______ AMCII

[illegible] CONCENTRATION(TC): ______ HOURS, MAXIMUM 6-HR RAIN: ______ INCHES

[illegible] INVENTORIED BY: Roe & Galloway DATE: 5/30/80

[illegible]: ______ DATE: ______ D/S HAZARD BY: Galloway DATE: 5/30/80

[illegible] NAME OF PROJECT: ______ POOL AREAS OBTAINED BY: Planimeter

CONTACT AT DAM: ______ PHONE: ______

[illegible] OBTAINED FROM: Field survey; book [illegible]

[illegible] SPIL. DESC.: Parabolic channel; 3.3' deep

[illegible] SPIL. DESC.: CMP riser/ drop inlet w/ 30" CMP trash rack

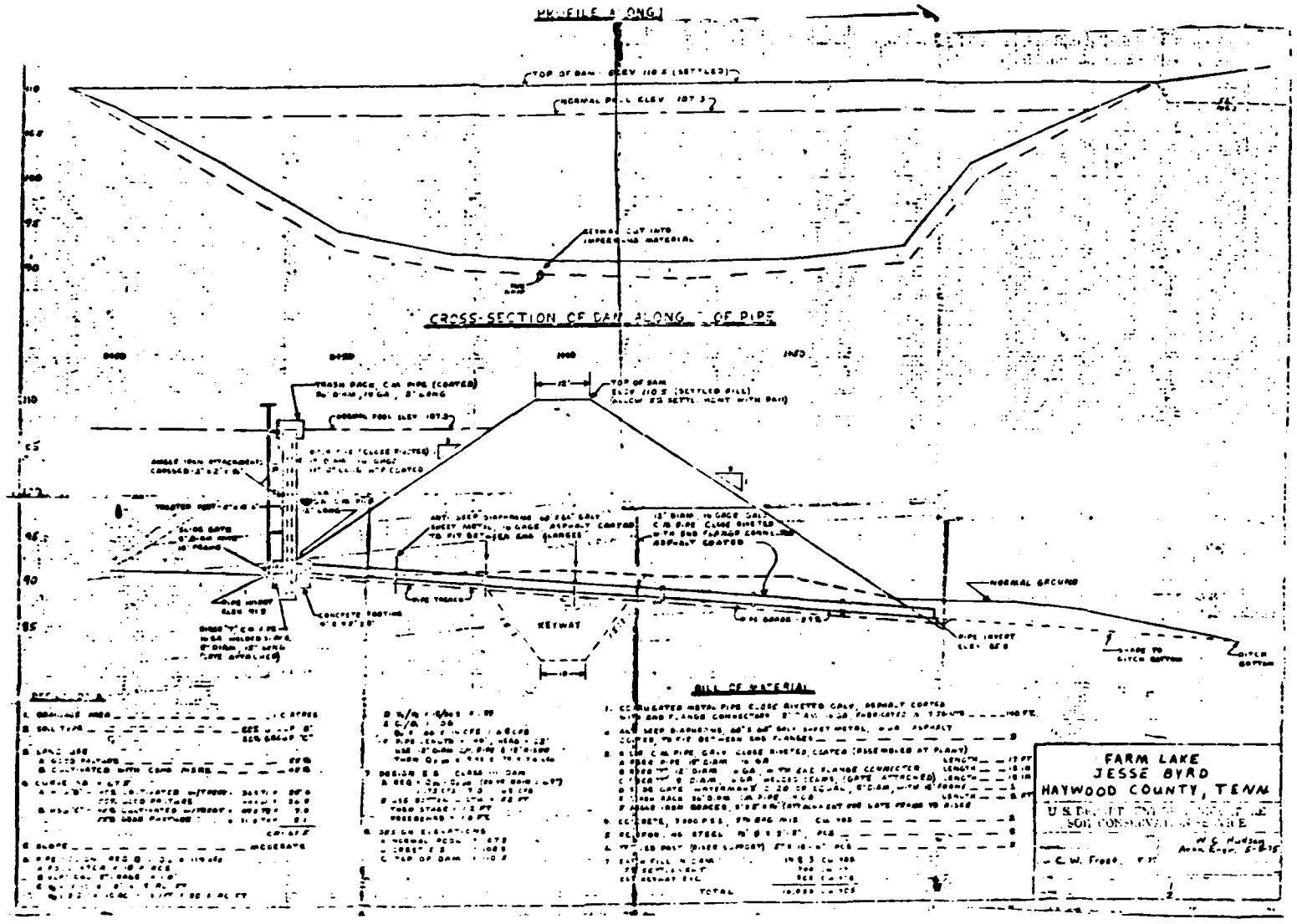
[illegible]ATIONS REF. TO: TBM APPROX ELEV: 388 FT MSL

[illegible] DRAIN: MATERIAL: Slide gate SIZE: 1' dia ELEVATION: 36[illegible]

[illegible]: [illegible] 8" sweet gum tree on lt EOD U/S of crest about 150' at lake edge.

APPENDIX G

SCS PLANS FOR DAM


PROFILE ALONG
CROSS-SECTION OF DAM ALONG ℄ OF PIPE
KEYWAY
NORMAL GROUND
BILL OF MATERIAL
FARM LAKE
JESSE BYRD
HAYWOOD COUNTY, TENN.

APPENDIX H

HAZARD POTENTIAL

AND

CONDITION CLASSIFICATION DEFINITIONS

DEPARTMENT OF THE ARMY

OFFICE OF THE CHIEF OF ENGINEERS

HAZARD POTENTIAL CLASSIFICATION*

Category	Loss of Life	Economic Loss
Low	None expected (No permanent structures for human habitation)	Minimal (Undeveloped to occasional structures or agriculture)
Significant	Few (No urban developments and no more than a small number of inhabitable structures)	Appreciable (Notable agriculture, industry or structures)
High	More than few	Excessive (Extensive community, industry or agriculture)

*U.S. Army Corps of Engineers, Recommended Guidelines for Safety Inspection of Dams.

TENNESSEE DEPARTMENT OF CONSERVATION

DIVISION OF WATER RESOURCES

DAMAGE POTENTIAL CATEGORY*

Category	Description
1.	Dams located where failure would probably result in any of the following: loss of human life; excessive economic loss due to damage of downstream properties; excessive economic loss, public damage to roads or any public or private utilities.
2.	Dams located in predominantly rural or agricultural areas where failure may damage downstream private or public property but such damage would be relatively minor and within the general financial capabilities of the dam owner. Public hazard or inconvenience due to loss of roads or any public or private utilities would be minor and of short duration. Chances of loss of human life would be possible but remote.
3.	Dams located in rural or agricultural areas where failure may damage farm buildings or agricultural land but such damage would be more or less confined to the dam owner's property. No loss of human life would be expected.

* Tennessee Department of Conservation, Division of Water Resources, Rules and Regulations Applied to the Safe Dams Act of 1973. Chapter 0400-4-1.

DEFINITION OF CONDITION CLASSIFICATION

"Unsafe - Emergency" - A dam in a state of imminent failure. State and local authorities and downstream residents should be advised immediately, reservoir drained, or combination of the above (e.g., advanced piping, major slope instability, recent sudden collapse of a portion of the foundation, imminent overtopping, etc.).

"Unsafe - Nonemergency" - A dam with obviously serious deficiencies which clearly could develop, or are developing, into failure modes but do not yet pose the threat of imminent failure. State and local authorities should be advised promptly and remedial work should begin as soon as practical. Someone should be assigned to periodically check on the dam's condition until remedial work is begun. Drawing down the reservoir should be considered, e.g., flowing seepage from embankment which could lead to piping, evidence of solution channels or cavitation in the foundation, seriously inadequate spillway capacity as per ETL 1110-2-234, history of recurring slope instability, etc.).

"Significantly Deficient" - A dam with deficiencies which, if left unchecked, would likely become serious deficiencies and could ultimately result in failure. Advise State authorities and recommend remedial work be scheduled in time to prevent substantial further deterioration of the condition(s)--usually within six months to a year or sooner (e.g., heavy growth of sizeable trees on slopes, potentially serious erosion, spillway discharge channel too close to embankment, etc.).

"Deficient" - A dam with deficiencies which need attention but which would not likely effect the safety of the dam unless left unchecked for a long period of time. Advise State authorities and recommend remedial action at owner's convenience but before the problem can escalate into a significant deficiency (e.g., brush and/or few or very small trees on embankment, long term deterioration of masonry or metal outlet features, formation of deep ruts in embankment roadway, deterioration of riprap, etc.).

"Not Deficient" - Well constructed and maintained dam with no apparent deficiencies relative to its safety and structural integrity.

APPENDIX I

CORRESPONDENCE

TENNESSEE DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES
4721 TROUSDALE DRIVE, NASHVILLE 37.20
615/741-6860

Certified

December 1, 1980

Mr. Jesse Byrd
Route 3
Brownsville, TN 38012

Dear Dam Owner:

As provided by the State Safe Dams Act, Tennessee Code Annotated, Sections 70-2501 to 70-2530, non-federal dams in Tennessee must be inspected and certified for safety by our agency. According to our records, you are identified as the owner of Byrd Dam, located in Haywood County, Tennessee. Enclosed for your information and review is a copy of our inventory record on the structure along with a copy of the Act and adopted rules and regulations.

Tentative plans are to schedule a safety inspection of your dam within the next few months. A staff engineer will very shortly be in further communication with you to discuss the pending inspection and your responsibilities under the Safe Dams Act. Your immediate attention, however, is called to the matter of maintaining the earthen dam with a good grass cover and clear of all brush, undergrowth and tree growth. If these conditions do not presently exist, please make plans to remove the brush, undergrowth and all trees less than two inches in diameter as soon as possible. Larger trees may have to be removed at a later date but must be done so under the direction of an experienced engineer.

Please let me, or our Chief Engineer, Mr. Ed O'Neill, know of any assistance we might be.

Very truly yours,

Robert A. Hunt, P.E.
Director, Division of Water Resources

RAH:lt

Enclosures

ORNED-G

NON-FEDERAL DAM INSPECTION REVIEW BOARD
PO BOX 1070
NASHVILLE, TENNESSEE 37202

Commander, Nashville District
US Army, Corps of Engineers
PO Box 1070
Nashville, TN 37202

1. The Interagency Review Board, appointed by the Commander on 19 June 1981, presents the following recommendations after meeting on 16 July 1981, to consider the Phase I investigation report on Jesse Byrd Dam performed by Winsett-Simmons, Consterdine & Associates, Inc., under contract to the Tennessee Department of Conservation.

2. In recommendation c, the option of replacing the corrugated metal pipe should be added.

3. The outlet pipe should not be in the plunge pool, but above the pool. A qualified engineer should be engaged to remedy this situation.

4. The Board is in agreement with other report conclusions and recommendations following minor revisions.

FRANK B. COUCH, JR.
Chief, Geotechnical Branch
Chairman

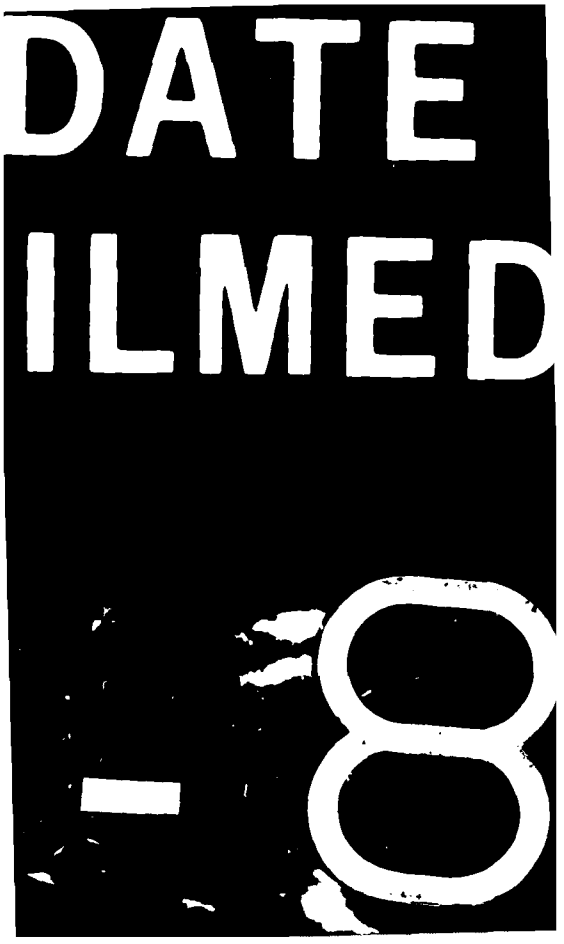
BOBBY G. MOORE
Assistant State Conservation Engineer
Alternate, Soil Conservation Service

EDMOND B. O'NEILL
Alternate, Division of Water Resources
State of Tennessee

THOMAS N. PORTER
Hydraulic Engineer
Alternate, Hydrology and Hydraulics Branch

EDWARD B. BOYD
Hydrologic Technician
Alternate, US Geological Survey

BRADLEY B. HOOT
Chief, Structural Section
Alternate, Design Branch


DATE
ILMED
8